THE PRESERVATION OF INFANT LIFE

A GUIDE FOR HEALTH VISITORS

EMILIA KANTHACK

LONDON
H. K. LEWIS, 136 GOWER STREET, W.C.
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A GUIDE FOR HEALTH VISITORS

SIX LECTURES TO THE VOLUNTARY HEALTH VISITORS IN THE BOROUGH OF ST. PANCRAS

BY

EMILIA KANTHACK

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H. K. LEWIS, 136 GOWER STREET, W.C.

1907

Dedicated

TO MY GODCHILD

BABY BETTY

PREFACE

This little book, by the sister of the late Professor Kanthack of Cambridge, contains lectures delivered by her to Voluntary Health Visitors in St. Pancras.

In this borough our ideal for the prevention of Infantile Mortality has been, and continues to be, to make the *mother* the central figure round which all the agencies may revolve for the protection and preservation of the health of *both* mother and child.

The lectures are printed in the same colloquial form as that in which they were delivered, and so gain in familiarity of style and facility of reading, and are strongly recommended to those who intend to undertake health visiting amongst the poor, whether in an amateur or in a professional capacity.

JOHN F. J. SYKES,
Medical Officer of Health, St. Pancras.

Town Hall,
Pancras Road,
London, N.W. 1907.

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THE PRESERVATION OF INFANT LIFE

LECTURE I

INFANT MORTALITY AND HEALTH VISITING

The Syllabus of these Lectures that I am about to address to you will tell you that we are going to discuss the Preservation of Infant Life in the six afternoons that we are to meet.

Now this is, of course, a very wide subject, and even if we skimmed over it as lightly as swallows, we should not go very far in these six hours. We are not going to attempt anything so impossible, so it will be well for us to come to a clear understanding as to the particular way in which we are going to tackle the subject, so that we can make the most profitable use of the short time at our disposal.

I should like first of all to say to you that I have the greatest sympathy with the nature of your work. As a teacher of midwifery, working amongst the very poorest class of people, I had plenty of opportunity for realising the demand for such work as yours.

Midwives, you see, are very busy people, and they can never hope to get any regular routine into their daily

lives. Babies are remarkably irregular in their mode of entrance into the world, and, generally speaking, a busy midwife is a person constantly in demand, and she has no time for keeping her eye on her babies and mothers after the prescribed ten days are over.

As a rule, everything goes on remarkably well during the ten days' lying-in period, considering the poverty and wretchedness that so often reign, and the midwife "signs off" on the tenth day and writes in her register, under the heading "Condition of Mother and Child": "Both satisfactory." So it may be on the *tenth* day, but there is no staying power in the condition of mother and child. The mother has as yet been kept in bed, and has had no great physical test imposed upon her beyond providing her baby with breast-milk; and the midwife—if she is worth anything at all—has managed to keep that going all right by incessantly preaching the doctrine of the necessity for plenty of fluid nourishment, and by seeing that it is forthcoming.

But these poor mothers have no spun-out convalescence, with all its comfortable details of a dressing-gown, a couch with soft cushions, and a cosy bedroom fire. Once they get up, they plunge straight away into all the household cares; and what is often the direct result? The milk deteriorates, dwindles, and finally disappears, and the baby suffers irreparably. As I said before, midwives seldom have time, in busy, populous districts, to act as guide, philosopher, and friend after the mother is out of bed, and when she most needs help and sympathy of a judicious kind. But that does not mean that because a midwife cannot keep in touch with her old cases, she does not worry about them. And I am quite sure that every right-thinking midwife will welcome the institution of Health Visitors, who will take up her work where she

leaves off. It seems to me the most natural thing in the world for the two to co-operate cordially and work very well together. The work should be done on parallel lines, and it is not in the nature of parallel lines to clash.

What I have come here to do is to give you all the help I can, by telling you of the conditions that you may expect to find and all I know about the best way of dealing with them.

I am very much at home with the class of persons who will come under your sphere of influence; perhaps you will not mind if I say a little to you about your attitude towards them.

You see, you will not be a scrap of use to them or to their babies unless you understand them and they understand you. So you must do your level best to make yourself acquainted with their habits of mind and modes of speech and their code of manners, as well as with their physical and economic conditions. Approach the subject in a truly scientific spirit of unbiassed inquiry, and, believe me, it will well repay your trouble.

You will understand them right enough if you take an amazing interest in them as human beings, and you must be *very fond* of them *as a class*, even including the rather horrid, dirty individuals. Always think of the dreadful pity of it all! Then you cannot help having tact, for tact is really instinctive sympathy, and sympathetic understanding is what you want, all along the line. They are sharp critics, these people, and they are quick to appreciate good manners. I heard one of them say once of a hospital sister, "Sister is a real lidy—she always treats you like a lidy." I always approached my East-end patients with my very best manners, and extended the same little courteous considerations to them

that I would have observed towards a lady, say, in Park Lane. They are very quick to respond to well-bred courtesy, where it is genuine, and those who work among very poor, ignorant, and even degraded classes will find that they can, to a very large measure, carry their own atmosphere about with them. Out of sheer ignorance the poor are often inarticulate, and when they do not thank you, but apparently accept all you do grudgingly and mutely, it is not that they are not grateful, but they do not know how to make pretty speeches.

You may think I am attaching needless importance to your manner towards these women whom you are going to visit and hope to influence, but I do not think I am. They are curious people—pitiably ignorant and superstitious, full of prejudices, and often stuffed with dreadful advice from terrible old gamps and dowagers in their immediate vicinity. But if they *like* you, and if you can succeed in impressing them with your air of experience, you can do anything you like with them. To my mind, personality counts more than anything else in any form of work dealing with humanity. We cannot all of us be strong personalities, but what we can all do is to cultivate *imagination*. Tact and sympathy, after all, depend entirely on imagination. Before you can sympathise with people, you must first be able to project yourself in imagination into their conditions.

I am quite sure none of you will be as wanting in tact as one Health Visitor about whom I heard. She came in to see a baby only a few days old, and, no doubt by way of expressing her sympathy, said to the mother, "Is *that* the baby? Poor little thing, it *is* small! I shouldn't think it would live long!" Imagine the feelings of the midwife when she came in a few hours later and found a very depressed mother weeping

over her doomed infant! But I understand that you keep right away from the baby and its mother while the midwife is in attendance, and this is a very wise division of labour.

Perhaps you will not mind my telling you that the average midwife does not regard the Health Visitor with a favourable eye. She is apt to say, with a smile of scorn, "Much *she* knows about babies; only comes here asking questions and interfering and upsetting people!"

Now, this is a very unfortunate and quite unnecessary state of things, and is, moreover, detrimental to the success of our crusade against Infantile Mortality. Very likely there has been a little want of tact or judgment at times, and so some regrettable friction has arisen.

I know midwives exceedingly well. I have the advantage, you see, of having been a midwife myself. As a class, we have some really splendid virtues; but some of us are terribly jealous and prejudiced, and are apt to regard other people who visit our cases as interfering busybodies. Therefore, it is always better for the Health Visitor to keep away from babies during the entire lying-in period. You must get your innings afterwards, and that is the time when your visit may be of valuable use if you know how to use your opportunity for giving timely help and counsel.

I have great sympathy with midwives, and I am exceedingly proud of having been one, but I have one constant protest to make against the members of my profession as a class, and that is, that the majority do not realise what an immense power for reducing the overwhelming sum of Infantile Mortality lies in their hands, if they would only carry the principles of Public Health and Preventive Medicine into their profession, instead of being content with being merely midwives.

For most midwives, a baby exists exactly ten days. I am not speaking now of monthly nurses or of midwives attending well-to-do people. I am speaking of midwives attending the class of people where Infant Mortality is highest.

It is just with this class that a midwife has most influence. *You* can never hope to have anything like the same influence that the midwife has! To begin with, she is first in the field. But the great point is that they know what a midwife *is*, just as they know what a doctor is.

A doctor and a midwife have got a definite label, and they come in answer to a tangible, urgent demand. The poor also know what a sanitary inspector is, and associate him with pipes and drains, and they know the school-attendance officer and the rent-collector and gas-collector and all the other collectors. But they cannot take in the Health Visitor, and cannot make out what it is precisely that you are after.

They regard you with a certain amount of suspicion, which you must disarm, and I admit that some difficulty attaches itself to your vocation, and that you need explanation before you can reach the intelligence and sympathies of the people you want to help.

There is one thing about which you will not be long left in doubt, and that is, how these people regard you. They are very elemental beings, and there is no veneer of social convention about them. They will soon let you know if they approve of you or not, and you will make more headway with them in ten minutes than, under ordinary circumstances, in ten days with your own class. That is why I find working among them so eminently satisfactory and interesting.

Another thing I would like to say for your encourage-

ment. You must always remember that if you only influence *one* mother, you have done more good than you can see the end of. Remember, these women lead very gregarious lives, and are far more in constant daily communication with each other than we are. Therefore, if you influence *one* woman successfully, you may, through her, spread your influence through a wide community of doorstep acquaintances. To them, babies are a subject of inexhaustible interest. There is no "close season" for babies, so there is always occasion at hand for your influence to spread. That is where your opportunity, and with it your responsibility, come in.

You may think that all this has not much to do with Infantile Mortality and the Preservation of Infant Life; but I think you will find that it has very much to do with them indirectly, for your choicest arguments will fall flat, and might as well be spoken to the air, unless you gain the ear of these poor mothers you are going to visit.

Well, now, what is *meant* by Infantile Mortality? As we know, it means that out of every 1,000 deaths that occur a very large proportion are infants, and that out of every 1,000 births from 100 to 200 or more die within the first year of life.

That is bad enough, but unfortunately that is not all. The infants who die are done with, and no more is heard of them. But there are all those others who do *not* die, but just manage to hang on with a marvellous tenacity, and then drop out of existence later on in childhood. Some survive, who live to be men and women, human beings with everything against them, and who do much to deteriorate the race—the nation's assets and England's future working men and future mothers. In the struggle for existence there is a tremendous survival of the unfit as well as of the fit, and the unfit breed as well as the fit. In an ideal

world there would be no Infantile Mortality. Theoretically, it is an anomaly. But we do not live in an ideal world, and the people we have to deal with live under conditions which are far more conducive to race-deterioration and race-degeneration than to the converse; so we have a good deal to fight against. But before we rush enthusiastically into the fray to battle against the many-headed monster that is such a black disgrace to our so-called civilisation, let us try to realise the factors that bring it into being, and then we shall be in a better position to deal with them.

Infantile Mortality can only be fought on preventive lines. What we have to prevent are the factors of danger which give the baby such a bad start in life, and these we are going to talk about later on.

We must realise, first of all, what sort of a little organism we have to deal with. A baby is, physiologically speaking, a terribly hard-worked little individual. We adults are only concerned with the daily business of squaring our accounts—of keeping our physiological output and in-take equal. But a baby has to do more than keep its balance-sheet intact—it has to provide a credit account largely to the good, because it has to grow as well as to make up what it loses. And few people realise at what an enormous rate a baby grows during the first few months of its life! Imagine yourself doubling your present weight in four months! That is the rate at which a normal baby grows during the first four months of life.

We want not only to keep babies *alive*, but we want them to be healthy young animals. Lots of people lived through the Siege of Paris, but it left few of them as it found them. There are deadly agencies at work against the unfortunate baby, and it is very uphill work getting

the better of them; but we have, at all events, one sure ally, and that is the baby itself. It is extraordinary how difficult it is to kill a baby!—barring accidents, of course. It is a marvel how they survive horrors of bad feeding, exposure, and dirt. But the baby *wants* to live—it is against the natural order of things that babies should die at all, and that gives them a wonderful tenacity.

Nature has only one object in life, and that is *race-maintenance.* Therefore, wherever there are great risks attending the development of the young of any animal, the young are produced in such quantities as to leave a large surplus for fatalities. On the other hand, where the young are produced in comparatively small numbers, they receive a corresponding protection and prolonged maternal safeguarding.

Let us think about the baby as a little biological organism, and compare it with other young animals.

We must first realise that it is an entity long before it is born. From the time that it is a little unicellular organism, with all the potentialities of a full-sized human being packed into it, an individual existence is going on which is steadily growing by cell-division and by most wonderful and complicated processes of folding-in and pushing-out, splitting into layers, forming of cavities, and so forth, until, in course of time, from a shapeless mass of cells, a miniature edition of a grown-up person is ready to enter the world.

During this time, being a young mammal, it is absolutely dependent on its mother for its nutrition. A sea-urchin mother drops her eggs into the water, and does not trouble herself any further about her young. Each egg is provided with sufficient food to last it until the moment comes for it to emerge as a free-swimming little individual. A chick is also set up with a larder of its own, which is

the yolk of the egg. When that is used up, the chick knows quite well that it must get out of the shell and forage for itself. But the hen-mother does more for her young than the sea-urchin mother does, for she keeps the chick warm all the time that it is developing inside the egg-shell—she acts as an incubator, in fact. When we come to the human mother, however, we find that she, in common with all mammalian mothers, has everything to do for her offspring. She has to keep it supplied with food, to keep it supplied with oxygen, to clear away its waste products, and to keep it warm, and, over and above all that, she has to prepare a future private dairy for it, for it is not like a chick that can pick up its own food the minute it is born.

We thus see very clearly that if we want to safeguard the baby and give it a good start in life, it is the baby's *mother* we must look after during the first nine months of the baby's life—for the baby *is* alive all that time, though living in strict retirement.

I do not intend to go deeply into the physiological details of the subject, but we must just glance at the condition of things while the baby is growing in its mother's uterus, and then it will help us to realise the entire dependence of the baby on its mother's well-being.

If expectant mothers could all be well fed, properly instructed, guarded from strain and accidents, provided with a plentiful supply of fresh air, and kept warm in winter, we should hear vastly less about Infantile Mortality. I want to make it very obvious to you that the mother's well-being and the developing baby's well-being are inseparable, and that their physiological interests are identical.

You all know, of course, that before birth the child derives its nourishment from the mother by means of an intermediate organ called the placenta. This organ is

popularly called the "after-birth," because it is, under normal conditions, expelled fifteen to twenty minutes after the birth of the child.

The placenta is a temporary organ, and acts as a kind of "middleman." It is, in fact, a transmission station, whereby the mother's blood passes on oxygen to the fœtal circulation and, at the same time, carries off carbonic acid and other waste products.

It is a spongy organ, being provided with innumerable open pockets, like the holes in a sponge. It is a flat, disc-like mass, one surface being firmly attached to the wall of the gradually expanding uterus. Through this incorporation with the uterine wall, the maternal blood is poured into the innumerable open pockets or sponge-holes. Why does it not pour out again, as quickly as it pours in? Because into each pocket dips a finger-like process so exactly fitting it that there is no leakage. These little projections belong to the fœtal half of the placenta. They are only covered by a fine, filmy membrane, and through this permeable medium diffusion continually takes place—oxygen passes into the fœtal blood, and carbonic acid passes out to the maternal blood and is got rid of.

The baby is not attached directly to the placenta, like the placenta is attached to the uterine wall. That would be inconvenient, because the baby has to grow, and it would be dangerous, because the baby has to float in a liquid medium, to prevent jarring and accidents. So there is a long cable-like arrangement, running from the child's navel to the placenta, and within the cable lie the main trunks conveying the pure blood to the child and the impure blood back to the mother. This is what is known as the baby's cord, and it is severed shortly after delivery, after being very tightly tied to prevent bleeding.

This is, then, very briefly, the condition of affairs before

the birth of the child. As I said before, the reason why I trouble you with these details, is because I want you to be in a position to realise the essential physiological fact that anything that in any way deteriorates the *quality* of the mother's blood must affect that of her unborn child.

That is one aspect of the case. Another, equally important, is that any accident or undue strain may loosen the placenta away from the uterine wall, and it is impossible that this should occur without hæmorrhage ensuing. Hæmorrhage means not only loss of blood to the mother, but loss of oxygen and nutrition to the growing fœtus, and thus we have a state of affairs that is bound to affect the child prejudicially. Either the baby is born prematurely, or, if it goes to full term, we get an immature baby; but we are far more likely to get a premature birth.

Later on we will talk about causes inducing hæmorrhage and premature confinements—to-day we are dealing only with generalities.

What we must bear in mind is that parturition is not a disease, but Nature's device for the perpetuation of the race. It is perfect in every way, and no one who has had opportunities for studying its details can help being powerfully impressed with the beautiful fitness of the mechanism.

Unfortunately, though Nature is such an excellent midwife, and though her arrangements are so perfect, the path of physiological righteousness, thanks to the way we live now, is beset with dangers.

We are going to find out what some of the dangers are, and then we shall be in a position to try to get beforehand with them.

LECTURE II

THE HYGIENE OF PREGNANCY

THE first two sentences in the very excellent Advice Card to Mothers which is distributed in your own borough are as follows :

(i) That a number of infants are born before full time, and die soon after birth ;

(ii) That a number of full-time infants are born so feeble as to live only a few weeks.

To-day we are going to deal systematically with the factors largely responsible for this deplorable state of affairs.

We will exclude congenital malformations or deformities, because these we cannot in any way prevent, nor can they be satisfactorily accounted for. They certainly tend to endanger or enfeeble life when they interfere with vital functions—as, for example, a cleft palate may interfere with sucking.

We will take prematurity first, as it comes first on the card.

Now, how do you recognise prematurity in the absence of trustworthy data respecting the duration of the pregnancy ? The mothers themselves have often the vaguest notion as to the length of their own pregnancy. Also, they may intentionally give inaccurate information as an excuse for having nothing ready, or for not engaging a midwife in time.

So one should have some idea of the difference in

appearance between a premature baby and a full-time immature baby—what the midwife calls a "feeble" baby.

A premature baby, besides being very small and weighing very light, has generally a characteristic scarlet colour, not a healthy rosy pink. It soon loses this, and may turn into a very yellow baby. It is sometimes very hairy. Its cheeks are hairy, and its back, between the shoulders, is covered with soft down. The skin is very soft and fine and transparent. Its nails may be undeveloped on hands and feet, and the cartilage of its ears very flabby. Its flesh is loose, its body limp, its head rolls over helplessly. It is very torpid in its movements, and its cry is a feeble whine. Above all, it has very little *warmth*.

Its weight alone will not tell you that it is premature. But in a baby weighing only 4 lb. or less, prematurity may be assumed. An average baby weighs $7\frac{1}{2}$ lb. Length is of less importance than weight, but it should not be less than 19 inches. Length, more than weight, is affected by hereditary influences; weight, more than length, is affected by nutrition.

In a premature baby, if you watch its chest, its respiratory movements are extremely irregular. Its respiratory nerve-centre is not fit for work yet, and the whole respiratory mechanism wants co-ordination because it has been hurried out of the workshop too soon. The movements of its limbs are infrequent; there is none of that delight in kicking about that is so characteristic of all healthy young animals. All the muscles lack tone—both the voluntary and the involuntary muscles. The muscles of the tongue, cheek, and mouth may be so lacking in tone as to make sucking impossible.

In premature infants all the organs are imperfectly developed, and they are not ready for work. Especially is this true of the organs of digestion and the organs of

respiration, particularly the lungs. Hence a frequent cause of sudden death among premature infants is collapse of the lung (atelectasis).

Their body surface is so very large in comparison with their weight, that they lose a large amount of heat through radiation. This applies equally to undersized, full-term, feeble babies.

All these symptoms vary according to the degree of prematurity. I have described, say, a seven-months' baby. The nearer it is to full term, the less marked will these characters appear; but even a week too early gives you some of the characters. Nature is so very punctual in her methods, you see, and does not leave wide margins. Babies cannot be forced, like rhubarb or asparagus.

There is some confusion about the terms *abortion*, *miscarriage*, and *prematurity*. It is sometimes held to be convenient to call everything that happens in the *first* three months of pregnancy an *abortion*, in the *second* three months a *miscarriage*, and in the *third* three months a *premature confinement*. I much prefer, however, the other classification, as more simple and logical: if the child is born *before* it is *viable*—that is, before it is physiologically possible for it to live—it is an abortion or miscarriage, whichever you like to call it. Those born at a *viable* stage of development, but before full term, are premature infants. Normally, a child is not viable until the seventh lunar month of development; but there are cases on record where children born at six and a half months or even six months have been kept alive.

What causes abortion and maturity?

Some women have a tendency to miscarry, and where it is not the first pregnancy there is generally a history of previous miscarriages. A miscarriage is always a violation of nature, but, unfortunately, among poor women it is

regarded very lightly, and no proper care is taken at the time of the occurrence, with the result that lasting structural changes are fostered which induce a repetition of the abnormality on the next occasion.

Putting aside either some constitutional taint, the most important being syphilis, or the occurrence of any specific fever, like scarlet fever, small-pox, etc., the chief instigating causes of miscarriage are:

(i) Unhealthy conditions of life, whether among rich or poor; overheated, ill-ventilated rooms; excitement; fatigue; alcoholic drinks.

(ii) Every kind of exposure to noxious gases—*e.g.* rubber works, where carbon disulphide and naphthol are used as solvents and vulcanisers, and where everything is permeated with the smell of these substances, and where there is a feeling of perpetual nausea amongst the workers; or dry-cleaning works, where the workers are exposed to fumes of benzene, and so on.

(iii) Lead-poisoning is classic in producing abortion and prematurity.

(iv) Conditions affecting the respiratory system—*e.g.* bronchitis and pneumonia.

(v) Sudden fright or shock, or accidents, causing directly or indirectly the detachment of the placenta or injury to the pelvis.

(vi) In a few cases, the irritation produced in pregnant women by suckling. A pregnant woman who continues suckling injures *three* individuals: the baby she is suckling, the baby she is carrying, and herself. It is not possible for all three to get their rights, and, as a matter of fact, all three fare badly, and the unborn baby runs a good chance of being hurried into the world prematurely.

What happens to premature babies? The difficulties in the way of preserving their lives are very great, the main difficulties being (i) to nourish the baby, and (ii) to maintain its animal heat. It is always difficult to rear a premature infant, but the difficulties are almost insuperable unless you have had a start from the very first hour of life. Unless animal heat is maintained, not only growth but life itself is suspended, so we always urge the mothers of premature babies to keep them very warm. We wrap them up in non-absorbent cotton wool, which is a non-conducting material, and leave only the face exposed, and the bathing has to be done with great care to avoid exposure. Cuddled up in their mother's arms, they get the warmth of her body, and they live while the mother is in bed, but die a few weeks later, when they no longer have her undivided attention.

Some mothers tell you that all their babies were like that, and "grew up something wonderful." It is often quite true, and you will find, as you work amongst poor mothers, that, in spite of all the hard things that are said about the neglected babies of the poor, the devotion and unremitting care that some of these overworked mothers expend on some wretched little scrap of humanity, which they love all the better for being so feeble, is one of the most beautiful things in the world!

But though some of these little premature scraps do manage to grow up into fairly respectable children, such children can never quite get over the bad start they have had; it is bound to show itself at some later period.

We have dealt with premature babies at some length. But pretty much the same causes are responsible for the immaturity of full-time babies—babies born so feeble

that they only live for a few weeks because they have not the slightest power of resistance.

The fact is, if a mother, previous to the birth of her child, is leading a life in which she is lacking proper rest, proper food, and proper ventilation, she is very likely to become anæmic, and the baby will suffer because anæmia brings many evils in its train.

Anæmia means a deficiency of blood. It is, strictly speaking, a deficiency in the number of red corpuscles—*i.e.* in the "oxygen-carriers"—on which so much depends.

The oxygen is taken up by a substance called hæmoglobin. It is the red colouring-matter in the red corpuscles, and is as important in its function as a respiratory pigment as chlorophyll, the green colouring-matter, is in plant-life. There is no other substance that will carry the oxygen to the tissues which are waiting for it with such avidity, so you see what a difference it must make to us if we are deficient in red corpuscles, and consequently in hæmoglobin.

Anæmic persons, therefore, suffer from oxygen-starvation in their tissues. Not all pale people are anæmic, of course, and, on the other hand, people with a high colour may be anæmic. But pale, bloodless-looking lips, white ears, and blanched mucous surfaces generally indicate anæmic conditions.

The hæmoglobin, besides combining with oxygen, contains iron. The iron is only present in very minute quantities, but it is a most important constituent, and very difficult to replace, because it is very difficult to administer iron to anæmic people in such a form that it is assimilated, and if not assimilated it is not of the slightest use, in spite of the glowing advertisements attached to a variety of proprietary articles and patent medicines.

Now, iron is a substance that the baby wants almost more than anything else. It is absolutely essential to its growth. A healthy baby is born with a higher percentage of hæmoglobin in its blood than an adult has. As Bunge, a German physiologist, quaintly puts it, it is as if Nature wished to start the baby in its independent life with a surplus of hæmoglobin *secured* to it, rather than run the risk of its being dependent for it on uncertain conditions of milk-supply. From its mother's milk it gets what it needs in the way of iron, until the surplus is all used up; but by the time it is nine months old, it needs *more* than its mother's milk can give it, and consequently later-weaned babies are apt to become anæmic.

We see clearly that it is of the very greatest importance that pregnant women should have access to plenty of fresh air, and that they should work in well-ventilated quarters.

As a matter of fact, very poor women do not lead the shut-up lives of richer women who are advanced in pregnancy. To begin with, they have not the slightest delicacy about being seen in that condition, which is to them a more or less habitual one. They also run in and out of their houses a good deal, and in small houses the front door is generally wide open, and very often the back door too.

But inside the rooms, and particularly the sleeping-rooms, there are often far too many occupants, in addition to which, in the evening the atmosphere is often vitiated by the burning of an oil lamp. Women who work at home spend hours bending over their work in a stuffy room. Those who go to workshops sometimes spend long hours sitting or standing in a hot atmosphere, which dries the moisture out of them. Others work in hot, steaming laundries, which makes them very susceptible to chills.

All this is bad enough, but many of them cannot make good the extra wear and tear that such work entails by taking sufficient nourishing food.

It is astonishing on what a promiscuous and precarious diet many poor people manage to support existence, and do it fairly well too, working hard into the bargain. But not where there are *two* to feed. The baby then develops at the expense of its mother.

One does often see beautiful, heavy babies born of emaciated, anæmic mothers, and at first one is inclined to think that pre-natal conditions count for very little after all, because badly nourished mothers and finely developed babies often go together. But experience teaches us very soon that these splendid, fat babies have no staying power, and that they soon flag if conditions are unfavourable.

The mother tells you that she has "lots of milk—it simply runs away from her!" So she has, but it is thin, watery stuff, and the baby is a fat, flabby little creature, always hungry, always drinking, and always wet up to its neck!

What *is* a sensible hygiene of pregnancy? The best mode of life during pregnancy is ordinary life modified to suit the extra strain imposed on the organism.

Extraordinary conditions necessitate the adoption of extraordinary measures, but in pregnancy we are not dealing with an extraordinary condition at all, but with an essentially physiological process. Consequently, most of the conditions for meeting it are ready-made by Nature. All we have to do is to assist intelligently.

What is wanted, then, is (i) an increased supply of nourishing, easily digested food, containing a sufficient amount of fat and proteid (or meaty) matter, because there is so much new growth going on, and fat and proteid are

essential to the development of new structures; (ii) plenty of fresh air; (iii) plenty of restful sleep; (iv) moderate exercise without fatigue; (v) freedom from excitement and worry; (vi) scrupulous cleanliness.

If all these requirements could always be complied with, we should soon have an ideal race of babies! Unfortunately, nearly all of them are difficult to attain among the very poor, and we can only strive our utmost to improve some of the very bad conditions, and to teach and help the mothers to do what they can to mend matters themselves.

The food question is a very difficult one; chiefly owing to poverty, and also because the English poor are so hopelessly irrational and perverted about their food. They *will* eat the dearest and worst food they can choose, and they cook abominably, and have little aptitude for it. They prefer to eat tinned stuff, and they pour vinegar over everything. Tasty little stews, made of a few bones and bits of meat, seasoned with herbs and vegetables, and thickened with rice or barley, few of them take the trouble to make. The stew-pot on the hob meets with no appreciation from them. When they do not fry their food, they take it to the bakehouse and have it cooked for them. Let us hope that the present race of schoolchildren will be taught better.

For pregnant women a reasonable amount of hot meat is desirable; but when they are too poor to get it, one wishes they would eat more lentils, beans, and peas, which are excellent, but unfortunately so very few will take the trouble to cook them really nicely. Bacon is good for them, and so is cheese. But most of the poor women in London have wretched teeth, and cannot masticate cheese, which is therefore debarred, though it is an excellent proteid food. It contains the same proteid as milk,

which is casein. Casein, besides being highly nutritious, is doubly valuable, because it is a proteid which does not throw heavy work on the kidneys.

Advise them to eat stewed fruit, and recommend stewed prunes, which are especially good because they are laxative, and they are also cheap. Bananas are becoming quite as much the poor man's food in the East-end of London as in the Tropics, and the same applies to oranges. Orange-juice is held in great repute in the Tropics; among other things, as a remedy for biliousness, if taken on an empty stomach first thing in the morning. I have great faith in orange-juice for everybody, from bottle-babies upwards.

The foods to warn them against are sour, salt, or highly spiced foods, and all tinned foods.

The poor things love their teapots, and one must not be too hard on their greatest comfort in life. One would always rather it were tea than gin! But they drink such shocking stuff, letting it stew and brew by the hour, and seldom scalding out their teapots. No wonder they get flatulence and indigestion!

Cocoa is much better for them, particularly when they are suckling. After I had once made it for them, and induced them to take it, they would often go on with it. The best cocoas to recommend are those which do not require boiling and do not get lumpy in mixing. Rowntree's Elect Cocoa is excellent and economical, and very nice indeed with a spoonful of condensed milk stirred into it.

With regard to exercise, poor women do not as a rule suffer from any want of it; but the great point to remember about exercise is, that unless it is carried out under well-ventilated conditions, it is worse than useless, as it only produces exhaustion, without any compensation.

Exercise is beneficial for two reasons: (i) it strengthens

the muscular system, and (ii) promotes respiratory exchange. With regard to the *muscular* system, you know that if you were going to play in a lawn-tennis match, you would begin training weeks beforehand to get into form. And you certainly would not carefully abstain from any muscular work at all, in order to save up all your strength for the great occasion. If you did that, you would get fagged very quickly when it came to the point. On the contrary, the more you accustom your muscles to work, the more they can do. They will always get stronger and stronger through use, until you reach your highest muscular efficiency, provided you use them scientifically. I want you to realise that parturition is just as much a muscular performance as playing lawn-tennis or rowing a boat.

It involves, however, two different classes of muscle: voluntary muscles and involuntary muscles. Voluntary muscles are those which are largely under our control, and involuntary muscles act independently of our will-power.

In parturition the voluntary muscles only come into play quite late in the day, and are required for severe expulsive efforts. The chief agent in the expulsion of the fœtus is the contraction of the uterus, which is essentially a muscular bag, and by contracting in all directions tends to expel the foreign body within it through the only available aperture.

Long before the baby is born—weeks before, in fact—this work of contraction proceeds in an intermittent and painless manner. It is Nature practising and getting into form, as you get into form for a lawn-tennis match.

In reality, the whole of life is one long, muscular performance, and our involuntary muscles are hard at it, working night and day. Whether you work a pump-

handle up and down, or whether you swallow lumps of food, you are doing muscular work. Every breath you draw, every beat of the heart, means a vast amount of muscular effort and the using up of muscle-tissue.

Exercise is wanted in order to improve the tone of the muscle. By *tone* in physiology is meant the contractility of muscle-tissue. A muscle that remains tense and rigid is said to be in a state of "tonic" contraction. A muscle that is tired and badly nourished does not readily respond to any stimulus applied to it, and quickly becomes exhausted.

Now, it is highly important that pregnant women should have their muscle-tissue in good tone, for only thereby can the proper contraction and retraction of the uterus be secured.

By efficient *contraction*, the expulsion of the child is secured without prolonged exhausting labour, and by *retraction*, the permanent diminution of the uterine cavity is established, and there is then no danger of hæmorrhage after delivery. Severe hæmorrhage inevitably leads to anæmia, and consequent deterioration or even suppression of the mother's milk.

As regards exercise, from a *respiratory* point of view, it is essential because in this way metabolic interests are most expeditiously served.

Metabolism is rather an awe-inspiring word, but all it means is a sweep of waste material out of the tissues, and a supply of fresh, life-giving material to take its place—an exchange of old lamps for new. The lungs are merely a huge sort of reservoir or ante-chamber where the bulk of the waste material and fresh material are interchanged; but the *real* respiratory exchange goes on in all the tissue-cells in every part of the entire organism. This is called "tissue-respiration," which is a form of combustion. What goes on in the lungs is "external respiration."

Now, exercise increases respiration, and thus we get our lungs more thoroughly ventilated, and effect a quicker and more thorough respiratory exchange throughout our tissues.

But one thing is absolutely needful if the exercise is to be of any physiological benefit to us, and that is that it should be conducted where there is a constant supply of good air, with an adequate outlet for the products of combustion. Also, exercise carried to the point of fatigue is the direct opposite of beneficial, for "fatigued" muscle is actually *poisoned* muscle, because the products of combustion accumulate quicker than they can be got rid of.

What pregnant women should carefully avoid are all sorts of reckless acrobatic feats, for which they seem to have a particular fondness—such as standing on chairs perched on rickety tables to clean windows, and so on.

I have had some really dreadful cases of hæmorrhage before delivery from just these performances. All lifting of heavy weights, such as a wash-tub full of water, is dangerous, as well as every kind of strain.

Pregnant women should avoid mental excitement and sensational literature, and, whenever possible, painful or ghastly things should be kept from them. I am afraid that this is preaching a counsel of perfection, for, good as the poor are to each other under these circumstances, their topics of conversation are often, to say the least of it, injudicious, and they are extremely fond of regaling their neighbours who are expectant mothers with all sorts of horrors reminiscent of their own past obstetrical experiences, which lose nothing in the telling.

Women who work at sewing-machines suffer greatly from constipation during pregnancy, and this is one of the evils most urgently demanding attention, partly because it causes pressure and congestion, inducing hæmorrhoids,

which may painfully complicate labour, and also because reabsorption of poisonous gases may result. They often ask me what to take to relieve this condition. When they do, I recommend them to make an infusion of senna-leaves every night and drink it early in the morning. It is the cheapest purgative that can be safely recommended, and better than the drastic pills and heroic doses of salts they are so fond of taking.

Always impress on them that all *saline* purgatives are bad for the milk-supply; saline purgatives are, in fact, resorted to for drying up the milk when circumstances, such as the baby's death, make this necessary. Warn them against all patent pills of which they do not know the ingredients. They nearly all contain aloes, which is injurious to pregnant women and nursing mothers.

The opposite evil—diarrhœa—is equally mischievous in its effect on pregnant women, as persistent severe diarrhœa induces miscarriage.

Now a word about garters and stays. About garters there can be no two opinions. They are an element of danger because they encourage varicose veins, to which every pregnant woman is already prone, owing to the mechanical pressure of the gravid uterus obstructing the venous return of the blood to the heart. As a rule, poor women wear the worst form of garters, these generally consisting of pieces of string, tape, or bootlaces tied tightly below the knee.

They are apt to suffer from swollen feet during the last month, so always urge them to put their feet up whenever they can conveniently do so.

If there is any evidence of dropsy, that is, if the feet pit on pressure from your finger, urge them at once to see a doctor. Dropsy *may* indicate nothing serious; on the other hand, it is associated with some very serious

conditions involving the kidney, and their timely recognition is of vital importance to both mother and child.

Stays are theoretically wrong, but it is illogical to discard stays and then tie tight strings round the soft structures at the waist. The stays of poor women are weird atrocities, and generally present shapeless, sloppy objects held together with pieces of string, safety-pins, and anything that comes handy. They seem to derive a great deal of comfort from them, and wear them until the last possible moment. A great point to insist upon is that the stays do not press on the nipples, and are very wide and soft. The heavy, painful breasts should always be well supported during pregnancy and nursing; it is a most important point. During pregnancy it is important that the nipples should be very frequently bathed; in the later weeks of a *first* pregnancy, at least three times daily with clean, warm water. It may make a great difference later on in the matter of suckling.

Always pack off to a doctor as quickly as possible any pregnant woman who gives the slightest history of a fit. Pregnant women, especially those who are pregnant for the first time, are nervous and hysterical subjects, and a fit may mean nothing. But it may indicate a very serious condition, and that is a matter for the doctor to decide.

Above all, send to a doctor any pregnant woman who has never been delivered of a child if she shows the slightest sign of *deformity*. She may have a contracted pelvis, and it may be quite impossible for the baby to be born alive at full term. That again, in the interests of both mother and child, is a condition that should be recognised as early as possible.

A contracted pelvis is often the result of rickets in infancy. So we get a very far-reaching consequence of

rickets, and a very serious one from the Infantile Mortality point of view.

The way it comes about is this. The development of the adult pelvis out of the infantile pelvis is mainly due to the influence of body-weight. Where the body weighs down upon structures too soft and yielding to squarely meet the superimposed weight, irregular curving-in and bowing-out must inevitably take place, and so a contracted, "rickety" pelvis is produced. The undesirable conditions after birth we must leave for another occasion, as we have spent so much time on the details connected with pregnancy. I only hope I have succeeded in impressing on you the fact that in dealing with the Infantile Mortality problem it is the *mothers* we must go for—not the babies.

In other words—take care of the mothers, and the babies will, to a large extent, be cared for already.

Very often the welfare of the mother herself depends on the wage-earning capacity of the father; not only on his wage-earning capacity, but on the accident of his securing a supply of steady work giving a decent, living wage.

So the chain reaches farther and farther back—from baby to mother, from mother to father, from father to existing social conditions swaying the labour market, which in their turn result from economic conditions of supply and demand. We have to get at the very core of the evil before we can hope to effect a radical cure.

LECTURE III

WASHING AND DRESSING THE BABY

When the midwife pays her last call on the tenth day, there is the mother getting up for the first time, generally feeling very shaky, and often with no one to "do" for her and to look after the baby properly. You should go as soon as you can after the midwife has paid her final call, and you will in many cases be very welcome.

It is not your duty as Health Visitors to wash and dress babies, but it gives you a great advantage to know *how* to do it, and to be able to do it expertly in cases of emergency.

Take, for instance, the case of a first baby after the nurse or "help" has left. The young mother has perhaps never in her life washed so young an infant, and is now called upon to do it for the first time quite alone, feeling weak and nervous.

I once came upon the scene on the eleventh day, and found a girl of nineteen muddling over her baby, trying to wash it "like nurse did," and making a fearful hash of it! The baby was obviously disgusted at the whole performance, for it was screaming outrageously, and the poor little mother was on the verge of tears. I tucked up my sleeves and gave her a lesson on the spot, making her do it all herself, and we three—she and I and the baby—got on splendidly, and all the tears dried up.

The babies know, the instant you touch them, whether you are an expert or not. You must not for a moment think that you can impose upon a baby! You may cheat other people, but never hope to cheat a baby. The minute you get hold of it, it knows as well as possible whether you are afraid of it or not.

I am going to show you this afternoon how a baby is washed in a poor room, and I wish I could show it to you with a real baby; but, for one thing, it might not be good for the baby, and also, one can never be quite sure how a baby is going to behave in public! So we will take a life-sized, washable, jointed doll, and give that a bath instead.

Practical Demonstration

Most babies love being washed, if you do it the way they like. To do it expertly needs a good deal of practice, and every nurse has her own way of doing it; but essentials are the same in all cases, and the following are a few golden rules to remember.

Always have everything ready before you begin.

If you can, sit facing the light, and by the side of the fire in winter.

Take care that the baby's head is not too near the fire.

Warm all the clean things that will be used, and warm the towel for drying. Have something ready to put all soiled things into, and do not drop them on the floor.

Have *plenty* of water, and let it be the right temperature. You are not nurses who go about the world armed with thermometers, so you must learn from experience how warm the water should be.

Use a good plain soap. Primrose soap or white olive-oil soap is very good.

Have a warm towel or flannel on your knee, and wrap

the baby up in it, and wash and dry the baby's head and face first, then soap the baby all over and put it right into the water and wash the soap off. Dry it quickly and gently, and be very careful indeed to dry all the creases. Dab firmly and gently, but do not rub hard. All the clothing should be loose and warm, clean and dry.

But baby-washing was never learnt through lectures and demonstrations. It is quickly learnt through experience, and some women have a wonderful knack for it. I am not at all ashamed to say that there is no occupation in the world that I find more delightful and amusing than washing a baby, and it is an occupation that never gets stale with custom. I can really recommend it to you all—if you don't know it—as a most engaging pastime!

With the daily bath, certain other duties should be noted and attended to.

The baby's mouth and eyes should always be carefully cleaned with some clean boiled water and a few scraps of clean rag.

The state of the baby's bowels must also be inquired into, and regulated if necessary; but we will speak of this at a later lecture in connection with constipation.

Now I must say something about chafing of the baby's skin, because, though a small thing in itself, it may lead to bad sores and be a source of suffering and even danger to the poor baby.

It is not always want of care in the drying or neglecting to change the diapers frequently that induces chafing. The skin of some babies is very delicate, and chafing may result from the use of diapers washed with strong soda or with irritating soaps; or they may be new diapers never washed at all. All new diapers should be boiled before use.

Another very objectionable practice is to take off a

wet diaper, dry it in front of the fire, and put it on again. This invariably leads to chafing.

If the baby is suffering from some intestinal derangement, the excoriating nature of the stools will give rise to very severe chafing. Thrush, for instance, is often associated with a painful eruption over the baby's buttocks, and the mother will tell you quite triumphantly that the "thrush has worked right through him!" What has really happened is that the thrush-fungus has set up gastric fermentation and intestinal disturbance, resulting in exceedingly irritating stools which excoriate the baby's skin unless the diapers are changed perpetually and the baby is sponged clean each time. Again, a deep chafe under the arm may develop into an ulcerating sore, and may even involve the lymphatic glands in the armpit.

I never apply powder or grease to a baby unless absolutely necessary. No properly cared-for baby should need either. But on raw surfaces and in the presence of excoriating discharges grease is invaluable because discharges run off it. Poor people generally buy penny tins of vaseline, and though it is expensive in the end to buy material in such small quantities, it has this advantage, that a penny tin of vaseline does not last very long, and is consequently cleaner than a larger quantity that has had the lid off and fingers dug into it for a longer period. If powder is used, the skin must be *absolutely* dry first; otherwise the powder cakes on the damp skin.

A baby's health depends very much on the state in which its skin is kept, and a chronically dirty baby cannot long remain a healthy baby.

After the baby has had its bath, it wants a drink, and then ought to sleep for at least two hours.

While on the subject of baths, I would like briefly to discuss baths given for purposes other than that of mere cleanliness.

Baths may be given for a large number of reasons—to alleviate pain, to relax rigid muscles, to promote perspiration, to induce sleep; for warmth or for the reduction of temperature; they may be medicated, emollient, stimulating, and so on.

It is the time-honoured treatment to put a baby suffering from any kind of fit into a hot bath, and it often does very much good. But if this is done, it is an absolutely useless proceeding unless the bath is sufficiently large and sufficiently full of water to allow the child's body to be well covered. The water must be of the right temperature —that is, it must feel really warm to your hand—but the child's head must be kept cool by sponging with cold water. Great care must be taken to prevent the child being chilled after being taken out. All draughts must be excluded during the bathing. It must be quickly dried and rolled up at once in a warmed blanket and put straight to bed, and food should be withheld for some hours. But the most essential point to attend to when a baby has a fit is the state of the bowels. If the baby is constipated, it is necessary that means should be promptly adopted to relieve the condition.

Always tell mothers that when a baby has had a fit they should seek medical advice.

Sometimes a mustard bath is ordered. The points to remember in giving a mustard bath are the following: the water should not be as hot as for an ordinary hot-water bath; the baby's eyes must be protected; and it must not be forgotten that the baby's skin is more delicate than your hands, and that loose particles of mustard floating about in the water will adhere to the skin and blister it.

About a tablespoonful of mustard should be tied in a little square of muslin or thin clean rag, like a "blue-

bag," and the water poured on it, and then the bag should be stirred round in the bath. A plain hot-water bath is generally as efficacious, and is decidedly safer and pleasanter.

When cold, collapsed little babies, suffering from diarrhœa and vomiting, and on the verge of extinction from exhaustion, are brought to hospitals, they are sometimes put into a hot bath in front of the fire as a restorative measure, and it often acts beneficially. In this case the head is not sponged with cold water, but, on the contrary, rubbed gently with warm cloths to stimulate the cerebral circulation.

Emollient baths are given for irritating eruptions, and are prepared with bran or starch. They are very soothing and healing in many cases.

But whatever kind of bath is given, it must be given expeditiously, everything must be ready before commencing operations, there must be no draughts, and the baby must be properly dried and kept comfortably warm afterwards, without allowing it to sweat profusely.

Mothers should always be strongly urged to keep their babies out of the "family bed," both by day and night. The family bed is seldom clean, because it is such an undertaking to wash large sheets and blankets and quilts. It is very stuffy for the baby at the best of times, and there is always the grave danger of "overlaying" or of smothering with bedclothes.

I am always delighted when I can induce mothers to put their babies into clothes-baskets. The babies look very sweet in them, and there is always this advantage, that the blankets, sheets, and coverings, being so much smaller, are more easily washed. All that is wanted is a big pillow covered by a square bit of mackintosh and some small bedclothes. In my old hospital we always

kept our babies in clothes-baskets. I have seen very ingenious baby-beds made out of banana boxes. An empty banana box can be bought for a few pence, and, by tacking glazed calico over it can be converted into a most charming little crib for the baby, for it is just the right shape. A little mattress for it can be filled with bran, but avoid *flock-stuffing* like the plague!

Babies need far more cubic space than people generally imagine. The baby's greed for oxygen is out of all proportion to its size, and by rights every baby should have 1,000 cubic feet to itself. I am afraid it very often has to make shift with 100 cubic feet or less. Babies in institutions often do badly because they are kept so huddled together. They take up so little room that the poor little mortals often get defrauded of their proper amount of breathing space.

In conclusion, let me recommend you all to choose a "standard" baby for purposes of study and comparison. Among your acquaintance or in your own families there is sure to be a baby that is everything that a baby ought to be. Find out all you can about it—how much it weighs, how long it sleeps, how often it feeds, in fact, every fraction of a detail about it! Study its movements, its expression, its sounds, and all its little ways. It is only by being absolutely at home with the normal that we can notice small deviations in the abnormal. Know what a normal baby ought to look like at every successive month of its existence, and then you will be able to "standardise" the other babies by it.

LECTURE IV

INFANT NUTRITION

To-day we are going to devote our attention to the subject of Infant Nutrition.

The physiological development of the infant depends mainly on three factors: (i) inheritance, (ii) environment, and (iii) food.

The first we are powerless to alter—we can only take it into account; but environment we can do much to modify, and the proper food of the infant should be secured to it, no matter what the cost may be. The interests of national economy will thus be best served in the end. Infant feeding is practically the pivot on which the whole subject of Infant Mortality turns; but at the same time the problem of Infantile Mortality is not solved by merely putting the infant to its mother's breast.

In the country an infant will usually thrive even if it has poor food, because it has plenty of room and plenty of fresh air. On the other hand, even in a crowded city slum, as long as an infant has a plentiful supply of good breast-milk it will generally thrive, in spite of thoroughly bad surroundings. It is the *food* of the infant that exerts the greatest influence on its development.

This food may be either the food that Nature provided for all young mammals, or food from extraneous sources.

That the problem of feeding an infant by hand is very

far from being solved is proved by the fact that every year brings fresh artificial products into the market, all claiming to be the best substitute for mother's milk. I think Nature must smile to herself sometimes when she sees what vast amount of trouble we take over the things she does so perfectly—and so easily!

Now we here are all agreed, of course, that breast-milk is not only the *best food* for babies, but that no other food can come within appreciable distance of it. We all hold that as an article of faith, and experience proves it all along the line; but it is wise sometimes to examine the basis of our firmly established convictions, so we will go into the reasons we have for adopting this creed.

(i) In the first place it is right from an *ethical* point of view that a mother should suckle her own child. It is the duty which she owes to her child, which she owes to herself, and, finally, which she owes to Nature. Nature made her a mother, and meant that her child should depend on her, and *on her only*, for its sustenance during the first period of its existence.

Speaking from the biological point of view, it is the hideous wrongness of a human mammal not suckling its own young that strikes one so forcibly—that is, in cases where there *is* a choice in the matter. If one of the brute creation refused to suckle its young, it would be thought a monstrous violation of Nature, and yet a woman may evade this natural function and it arouses no comment!

There remains, however, a possibility of Nature revenging herself for the ignoring of her claims. Recently a German physiologist wrote as follows:

"The suppression of the functional activity of the breast is calculated to be revenged on the mother herself. The failure of the process of involution of the uterus after parturition, with subsequent disorders, may often be traced

to the evasion of this maternal function. It has been demonstrated that the omission of suckling is related to the marked increase of mammary cancer. During the normal lactation period the breast displays such a pronounced metabolic activity that the total net result of this activity accounts for at least twelve pounds increase of growth in the child. Is it reasonable to suppose that an organ possessing such a high degree of latent physiological activity can be ruthlessly set aside? or that it may be disregarded without running the risk of setting a physiological Nemesis on the track?" (Sellheim, from "Handbuch der Physiologie des Menschen": edited by W. Nagel.)

Among the poorest classes every woman suckles her child if she can. If she does not, it is either because she is physically unfit or because she goes out to work. Among educated and leisured classes there is often physical inability to suckle owing to the evolutionary force of civilised conditions detrimental to the development of primitive functions. Often, however, there is direct disregard or deliberate suppression of the mammary function.

There would not be so many expensive infant-foods on the market if there were not thousands of mothers ready to feed their children with them! Manufacturers of infant-foods send their advertisements and samples to the addresses of many of the birth-announcements in the daily papers. It would not pay them to do it if they gained nothing by it, and this in itself is a very emphatic commentary on the state of affairs.

(ii) Now we will see why breast-milk is the only perfect food from a *physiological* point of view.

I want us first to consider what nature of beings we are. We speak, in the language of metaphor, of a human being as a very marvellous piece of machinery, fearfully and wonderfully made. But we stand on a very much

higher plane than the most beautiful machinery can touch, though we respond to the same fundamental physical laws that regulate other mechanisms.

Also, up to a certain point, we can be accounted for chemically. Learned and laborious chemists have analysed us all to pieces, and found out that, after all, we only consist of eighteen or nineteen different elements built up into an overwhelming variety of complex combinations, and they can even build up some of these combinations in glass test-tubes in a laboratory. But even so, as some one once said, they are just so much nearer explaining living matter, as we are nearer to the sun by climbing on a table.

There is *something* that no amount of chemistry and physics can explain satisfactorily, and that something, for want of a better word, is called vital force.

Most of the makers of artificial foods work on the hypothesis that a baby's stomach is a test-tube, and ignore this wonderful vital quality. The way this living chemistry shows itself is this: We know that we are built up of countless millions of little cells. They are all derived from the same material to begin with, but afterwards they differentiate, and different kinds of cells have different work to do. That is called the physiological division of labour. The wonderful thing about these little cells is that they do not work in a blind, machine-like way, but they have a very marvellous attribute called *selective activity*.

Selective activity means nothing more nor less than that the cells know just when to work, what material to make, and what materials to select in making it.

Take the cells that secrete milk in the mammary glands. As time goes on, week by week, month by month—so gradually that there is no line of demarcation anywhere—

the cells manufacture the milk from the blood supplied to them, and *continuously* adapt the milk to accord with the child's growing needs.

I quoted Bunge, the German physiologist, once before, and I would like to quote him again. He is speaking of the various inorganic substances—lime salts, and so forth—contained in breast-milk, and he says: "The epithelial cells of the mammary gland *carefully select* from the totally differently built-up blood-plasma all the inorganic constituents needed by the infant in the exact proportions best adapted to further its growth and development towards the adult form."

The baby grows most rapidly during the first four months of life; the average weight curve will tell you that it gains most during the second, third, and fourth months. In order to enable it to do this, it gets from its mother's milk a higher percentage of proteid or building material in the first months than it does afterwards.

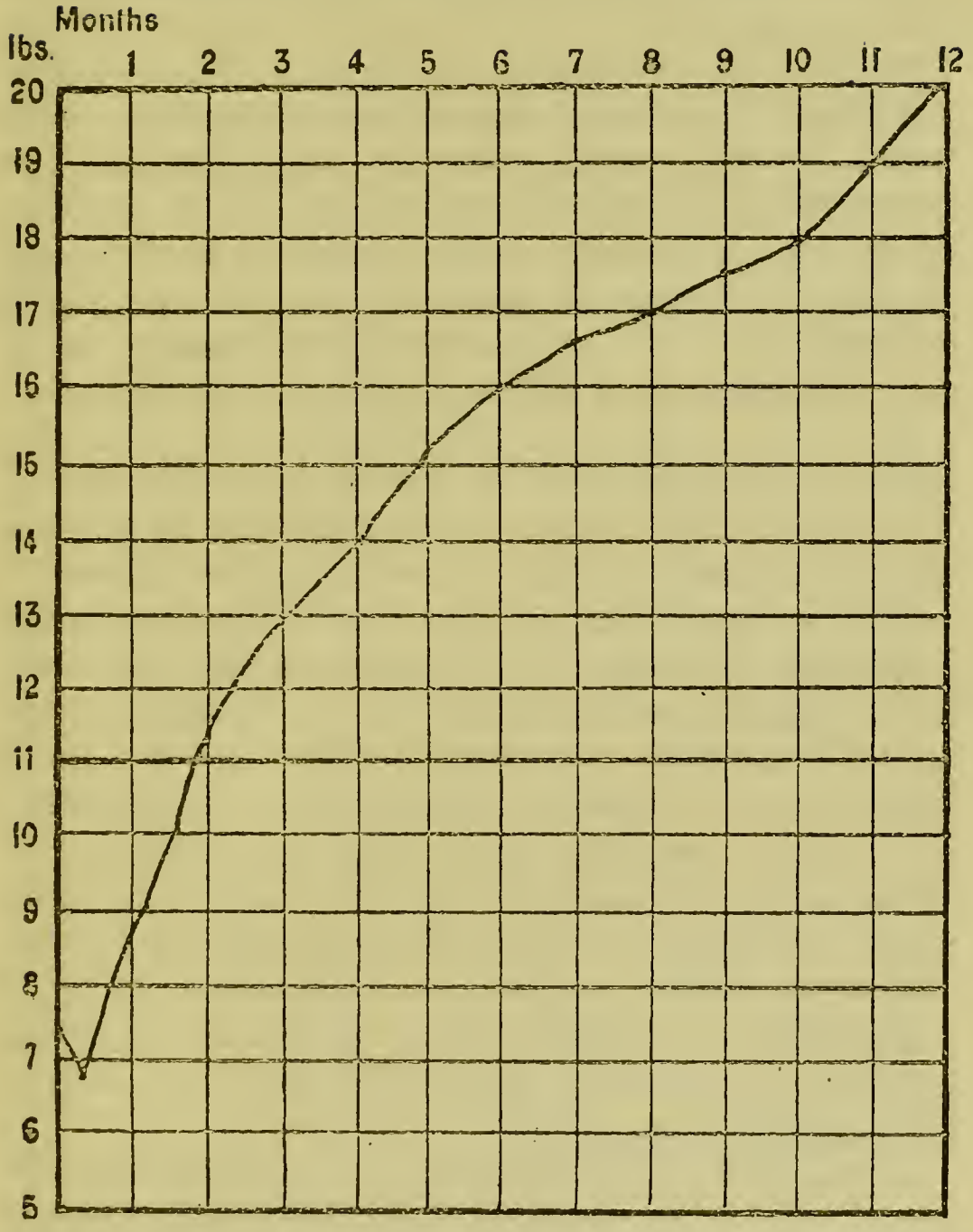
The fat percentage remains more or less constant throughout, but there is a rise in sugar corresponding with the fall in proteid.

So much for the *quality* of the milk.[1] But the *quantity* is also gradually increased from 10 oz., or half a pint, per day during the first week, to 40 oz., or 2 pints, at the ninth month, when it is time to wean.

[1] "A child that is suckled is maintained in a proteid metabolism homologous with its mother—in this way continuing the conditions of fœtal nutrition. But if the infant is reduced to proteid constituents of other animals, which are specifically different from the proteids of the human organism, more metabolic work is thrown upon it than upon the breast-fed child.

"It is not only the proteid *figure* that counts, but also the *specificity* of the proteid; before the child can make use of a proteid having a different specificity to its own, it must first reconstruct it to a like specificity." (Sellheim, "Handbuch der Physiologie des Menschen"; edited by W. Nagel.)

WEIGHT CURVE OF FIRST YEAR



From Hutchinson's "Lectures on Diseases of Children" (after Holt).

The quantity increases very rapidly up to about the eighth week, and after this much more slowly, in accordance again with the weight curve. Now, how can we do all this artificially?

It will be quite evident that it would be immeasurably difficult for us to enter into any close competition with Nature in this matter, with the coarse methods of modification and approximation we have at our disposal. We have to *guess* at the proper increase of quantity and the proper modification of quality, and then anxiously weigh our baby to see how we are getting on, and to see if we have made a good hit; if not, we have another shot. And yet this very same work Nature does beautifully, simply, and unobtrusively, without any tentative efforts, and does not brag in the end how successfully she has managed it, after first trying one way and then another.

However judiciously you may feed a baby artificially it will lack something, because it is not fed with *living* food. Often babies do splendidly for a little while on some pet food, and show a gratifying weekly gain of 4 to 5 ounces, and then seem to suddenly come to a standstill, and we very regretfully come to the conclusion that it will be wise to "change the food." But breast-milk never wants "changing"—it can be given straight on end for nine months without any break or change at all.

(iii) There is a further aspect of the overpowering superiority of mother's milk for the infant, and that is the question of *immunity*.

It is held by many physiologists as undoubtedly true that babies fed on breast-milk enjoy a far higher degree of immunity from infective diseases than those fed by hand.[1]

[1] "It has been shown that the blood-serum of breast-fed children is undoubtedly higher in bactericidal power than the blood-serum

It is held that babies are sent out into the world with a little store of what are known as anti-bodies in their blood, and these anti-bodies are the babies' defensive weapons against invading infective germs.

Breast-fed babies have the additional advantage of having their initial store of anti-bodies fostered and supplemented by their mother's milk, which is derived from the mother's serum. They are then held to be immune against infective diseases, such as measles, for instance, for about two years, by which time they are better able to resist infection.

It is surely dreadful that mothers should deprive their babies of any physiological defence against the invasion of the germs that swarm about them from the first moment of their existence!

We are all quite convinced now, first, of the great physiological importance of giving a baby the benefit of its natural food, and, secondly, the equal importance of maintaining the mother's health during that time, in order that the food may be of the right quality, and efficient to do what is required of it.

(iv) There is, finally, the *economic* aspect.

No one realises more than mothers of the poorest classes

of artificially fed children" (Sellheim, supported by Schenck, Wassermann, and Holt).

"Artificial feeding does not invariably lead to direct mortality, and one is apt, in consequence, to disregard the less obvious evils that accrue from it in the lasting harm done to the child by inducing a lack of soundness of constitution, the evidences of which may not appear until a much later period, and which leads to further degeneration of the race" (Sellheim).

"If women bestowed a fraction of the care and solicitude on averting the suppression of the breast-milk which they expend on averting the suppression of the menses, it would be of vast physiological benefit to themselves and to their offspring and to untold generations to come!" (Sellheim).

themselves that feeding the baby out of a bottle costs money, and that breast-feeding costs nothing. The difficulty is to make them see that if they do not spend money on their own food, there will be no breast-milk for the baby.

The lowest cost at which you can feed a baby, to feed it *satisfactorily*, with the proper quantity of good milk and cream, is half a crown a week. What a slum baby generally gets is a couple of tins of condensed milk. If full milk is used, these two tins cost 11*d.*, but very often cheaper brands of machine-skimmed milk are chosen. The mothers even tell you that skimmed milk is better for the baby because full milk is "too strong for it." Then, besides the food, there is the cost of bottles and teats, and generally some one to pay for "minding" the baby while the mother is at work, as well as so much per head for each of the other children, if there are such; so that the profit of going out to work is often negative.

There is, therefore, no doubt as to breast-feeding being on the side of economy.

But it must be very forcibly impressed on all nursing mothers that the baby's well-being depends on their *own* nutrition. Nutrition does not depend on mere eating and drinking, but on the physiological utility of the food taken.

I tell them that it is just as reasonable for them to expect to have milk in their breasts if they do not take proper food and drink, as it would be to expect to find a milk-can full after filling up a quantity of jugs from it. The great thing to remember is that what you take away you must put back. Cows must be well fed, so must human mothers. I always urge them to take a good drink every time they have finished feeding baby. It is no use giving them general orders to take plenty of liquid

nourishment. You must find out exactly what they do take, for what I call plenty and what they call plenty may be two very different things. It is astonishing on how very little one *can* keep nursing mothers going with ingenuity and perseverance, and it shows how Nature will look after its own as long as one works in the right direction.

Large quantities of liquid food are absolutely essential. A quantity of fluid raises the blood-pressure and helps the breast to secrete, and what the breast does not want is excreted through the skin and kidneys. Remember that the breast is a *secretory* organ and not an *excretory* organ, and waste material will not pass through it.

Large quantities of fluid also aid in preventing constipation.

In lying-in hospitals nursing mothers are fed with liquid food every two hours, in addition to light, nourishing solid food, and they drink at least four pints a day.

They should have milk chiefly, varied with milky tea, cocoa, gruel, and soup. Their diet should contain a sufficiency of fat, because breast-milk which is deficient in fat may foster rickets in the infant.

Poor women drink a great deal of tea, and have much faith in beer for nursing mothers.

I urge them to take plenty of cocoa made with water, drink as much milk as they can afford, and take thin gruel with condensed milk stirred into it, and *avoid alcohol.* They have a cherished belief in its value, but it should be entirely prohibited by midwives. It is costly, and does no good, but rather harm unless the mothers are working hard and can work it off, which seems rather a physiological waste of labour.

When alcohol gets into the body its greed for oxygen is such that it seizes oxygen wherever it can. It seizes

the oxygen taken up by the blood in its passage through the lungs, and thus robs the tissues of the oxygen they need, and thereby interferes with the proper oxidation of fats and carbohydrates.

Consequently, there is imperfect combustion of these bodies, and waste matters are not properly removed, as they cannot be got rid of until they are perfectly oxidised.

We have then at the same time clogging of the tissues with an accumulation of waste matters, and oxygen-starvation in the tissues. This must, of course, affect the milk-supply.

Always tell nursing mothers not to be afraid of drinking pure water. They are generally glad to do so, because suckling is "thirsty" work, but have a rooted belief that cold water will give them a "chill." I remind them that cows drink a lot of water—unfortunately, the milkman is so apt to think they have not drunk enough!

The water must be from a pure source, and drunk out of clean vessels; that is, of course, a very important condition.

To sum up, the conditions essential to success in breast-feeding are: that the mother should have a reasonable amount of proper nourishment, not be excessively over-worked nor exposed to bad air, should avoid constipation, guard against chills, avoid excitement, and last, but not least, pay great attention to her nipples.

Mothers of first babies often have sad trouble with their nipples. They are apt to get sore, and often, too, they are not sufficiently raised for the baby to suck easily, and there is nothing that makes a baby more cross and impatient. It often needs great patience and perseverance to bring about a better state of things, but it is worth taking a good deal of trouble over, where so much is at stake, and this trouble may be largely avoided by precautions taken before the baby is born.

Great regularity in feeding and absolute cleanliness are essentially the keynote of success.

Regular feeding trains the baby into regular habits of sleeping and waking, and that is a point of great value to busy house-mothers who have housework to get through as well as a baby to nurse. The value of training the baby to sleep for a space of six or seven hours at night cannot be exaggerated. A recognised authority maintains that a quiet, undisturbed night's rest is more conducive to the maintenance of a good milk-supply than anything else. It gives the baby's digestive system a rest, but the great point is that it gives sufficient time for rest and repair of the gland-tissue of the breasts, and it is of equal importance in reducing the strain on the mother's nerves caused by suckling.

If the baby is in the same bed with its mother, there is strong provocation to irregular feeding during the night, but very often a little sip of water or changing the child's diaper will settle it off to sleep again.

Sore nipples can nearly always be avoided by bathing the breasts with a little warm water and a clean rag after each feed. The child's mouth should at the same time be gently wiped out. The two must be kept equally clean, both before and after feeding. If this is always scrupulously attended to there is little fear of thrush occurring in the baby's mouth, or of sore nipples, and that terrible evil which cracked nipples bring in their train, breast-abscesses.

Breast-abscesses cause such intense suffering and may lead to such serious consequences that no trouble should be considered too great to keep them at bay. Sore nipples cause agonising pain, too, and a nipple-shield may be necessary. But it is as stringently necessary to keep these clean as it is to keep the nipple itself clean. I

have seen them left sticky after each feed, and then used again after first being smeared over with condensed milk out of a tin. Therefore I am never keen on their being used. If used, they should be rinsed under the cold-water tap after each feed, and kept until wanted again in a cup or basin of clean water, and taken to pieces each time. Also beg the mother *not* to moisten it in her own mouth before she puts the baby to it. That is quite as bad as dipping it into the condensed-milk tin or sugar basin.

It is quite possible to suckle entirely from one breast. I have seen breasts covered with old scars and so full of fibrous adhesions and scar-tissues that all glandular secretion was at an end. But the other breast has been quite equal to doing double duty. One woman had no nipple on one breast, having lost it with a breast-abscess. In her case we drove the milk out of that breast at once by bandaging it up with firm pressure, and she had no further trouble, and fed her baby entirely from the other one.

Whenever breasts get heavy and painful, gentle bathing with warm water is a very alleviating measure, and they should always be well supported. Sore nipples can generally be healed with applications of boric acid powder and glycerine smeared on after each feed, washing the nipples thoroughly first.

Nothing is so drastic in its immediate effect on the milk as nervous shocks or great worry. The milk may be driven away for hours as the result of an exciting altercation, a fright, or some worrying care. You must always beg mothers to keep as calm as possible, for the baby's sake, and not to worry, but it is not always easy for the poor things.

We must now say a few words as to the conditions which justify recourse to artificial feeding.

(i) Some authorities hold that no tubercular mother should nurse her child. Others say that if it is localised tubercular disease, and unless she comes of a very tubercular strain, it will not harm the child.

There is generally little choice in the matter. An emaciated tubercular woman rarely has enough milk to satisfy her child. Most certainly the decision should not rest with her, nor with the midwife, but with a medical authority.

(ii) If the labour has been attended with serious complications—severe hæmorrhage, septicæmia, "white leg," etc.—the milk is likely to be injurious to the child.

(iii) If the mother has any serious chronic complaint, such as heart disease, rheumatism, gastric disorders, etc., or is very delicate, so that nursing exhausts her without any corresponding advantage to the child, it is worse than useless to persist.

We have left ourselves very little time for discussing artificial feeding, nor could I hope to go into the details connected with this inexhaustible subject.

Confining ourselves to generalities, then, the dangers lie in the way of wrong food-stuffs, wrong proportions, introduction of micro-organisms, and lack of anti-scorbutic bodies.

Breast-milk, like all internal secretions, is an absolutely sterile fluid. Artificial food, on the other hand, is exposed to innumerable risks of contamination from its source until it reaches the baby.

Even if the milk is sterile it may be carried in dirty jugs, the bottles or teats may be dirty, tins of condensed milk may be opened with dirty tin-openers or may be exposed to all kinds of septic dust or contaminated by flies, and so on.

The common evil of artificial foods is that they lack *fat*,

and this lack of fat is, more than any other factor, responsible for the rickets of hand-fed infants.

Then there is the question of digestibility, which is more or less a question of the nature of the *clot* formed. The clot formed by mother's milk is soft and friable, and very different from the tough, leathery clot associated with the curdling of cow's milk.

The problem in feeding with cow's milk is to dilute the milk in such a manner as to prevent the formation of a hard clot, barley-water and lime-water being generally chosen as diluents.

Human milk contains an appreciable proportion of citrates, which seem to be of physiological importance to the child. In order to secure this necessary constituent, hand-fed babies are now given orange-juice and grape-juice, with very good results. The lack of fat in artificial foods may be met by giving cod-liver oil.

With regard to bottles, their name is legion. Unfortunately, the worst kinds are the cheapest, and this makes it a difficult mission to find convincing arguments against the long-tube feeding-bottles which should by rights be called "Infant Murderers," instead of having the name Queen Alexandra attached to them.

The best feeding-bottle is always the one which has the least number of pieces, and which allows water to be flushed right through it.

I once saw an advertisement for a feeding-bottle which said, "When the baby has done drinking it should be rinsed under the tap and kept in cold water." It was rather a quaint way of putting it, but the principle is quite correct, though, unfortunately, terribly neglected, and dirty bottles are responsible for a good deal of Infant Mortality.

Another evil of long-tube bottles is that the baby can suck away by itself, without the bottle being held. In

the meantime the mother or nurse can do other things. I always argue with them that they cannot do other things while the baby is at the breast, and it is always the best way, if driven to a substitute for breast-milk through force of circumstances, to copy the mode of breast-feeding as closely as possible, and to hold the baby comfortably, exactly as if it were at the breast.

I never give advice about hand-feeding if I am only making a casual visit. On the contrary, I impress on the mother that I could not possibly undertake to give any instructions unless I could see the baby every week and could weigh it regularly, and unless I could be always at hand to see it if anything went wrong.

Then I urge her, even if the baby is quite well, to go to some good hospital or dispensary, where they will undertake to see the child regularly and weigh it at stated intervals and advise her how to modify the food as the child grows older.

I only wish, with all my heart, that we had here in London regularly established "Mother-Clinics," where mothers with babies, *whether breast- or hand-fed,* would always be sure of a cordial welcome, and with regard to which one could have perfect confidence that the mothers would receive satisfactory advice and friendly treatment, and be encouraged to come as a routine practice once a week or once a fortnight.

The weighing of the baby should always be a special feature of such "Clinics," and each mother should have her baby's weight-chart explained to her, and her interest in the matter cultivated.

I am very strongly of the opinion that it is in such small nuclei of congregating mothers—both *actual* and *prospective* mothers—that valuable work will be done. In wise and friendly talk, and in the total absence of officialdom,

more ground can be covered in one afternoon than in a dozen visits to single mothers. Each mother and each baby should be individualised, and each case taken in hand on its own merits. The mother should be advised how to guard her own health in order that the suckling may be maintained as long as the baby needs it, and if weaning is inevitable, artificial feeding should be under medical control.

Some day, perhaps, we may hope for a law in England like the Roussel law in France, which prohibits the use of feeding-bottles with tubes, and of "dummies" or "comforters," and also the use of undigested, farinaceous foods for infants under seven months, and the sale of any infants' foods which do not bear an analysis on each packet and a Government certificate that they are non-injurious.

With a similar law to that, the earlier registration of births, and the establishment of dining-clubs for nursing mothers, the infant death-rate would soon decline materially.

The necessity for feeding suckling mothers who are too poor to buy their own food is very obvious to any one who has worked as a midwife among the very poor. Madame Coulet, in France, was the first to put into practical effect a scheme for feeding necessitous suckling mothers by establishing restaurants for them, and with results which justified the splendid energy of her attempts.

We have now made a very small beginning on the same lines in London, and we hope that results will be sufficiently encouraging to appeal to the public imagination, in order that such work may not lack strong financial support. I make no quarrel with the small beginnings and the homely contrivances which at present are the only available means. On the contrary, I would always advocate an enormous multiplication of such small centres for feeding nursing mothers as Mrs. W. E. Gordon has established in

Chelsea, rather than larger and more pretentious institutions, where the homely character would at once be lost. The mothers cannot go far away from home in the dinner-hour, and they must take their babies with them ; it is necessary, therefore, for the right success of such schemes, that little dining-centres should spring up like mushrooms in all directions.

If the food is taken to the necessitous mothers in their own homes, many of them will not eat it, but will save it for their hungry families, and one cannot blame them. But if the baby is to get the benefit of the food and the milk given, the mothers *must* come and consume it on the premises.

In conclusion, I would like to quote some words which are now almost a truism, but cannot be repeated too often. You will find them on the Advice Card to Mothers drawn up by the medical officer of health of your own borough, and they run as follows: "The only way to humanise cow's milk is to pass it through the mother." I think we may add that the best way to feed a baby is to feed its mother.

LECTURE V

THE FIRST YEAR OF LIFE AND MINOR AILMENTS

We are to-day going to consider the ordinary course of events in the baby's first year of life, and to glance at such minor ailments as may be anticipated, but to avert or modify which, much may be done.

The great point always to remember is that it is often from these minor troubles that actual diseases develop, so we will not regard anything as minor in kind, only in degree.

Now, we will go systematically to work, and we will first consider the material with which we have to deal.

I think few people realise what an incomplete piece of work a baby is at birth! The chick is ready to run about and pick up its own food directly it emerges from the shell. It is the same with all ground-birds—they are very quickly independent; in the wild state ground-birds are exposed to many dangers, and so they must look sharp. It is different with tree-birds, which are comparatively safe; they are more like our babies, and depend for a longer time on maternal care.

To all outward appearance, a baby looks just the same as its parents, only on a very much smaller scale. But a baby differs not only in size, but in proportion and structure, from its parents. It has got a very much larger liver, for one thing; but the most important difference is

in the structure of its bones. These are more like rods of cartilage than bone at first. People are so afraid of handling new-born babies for fear they should break, but they do not break so easily. They are so plastic that they stand any amount of bundling about directly after they are born.

The baby's liver is a very important organ to it during fœtal life, and is about twice the size, comparatively, of the adult liver. The adult liver is only about $\frac{1}{50}$ of the body-weight, while the baby's liver is $\frac{1}{25}$ of its body-weight. The liver is a very hard-working organ, perhaps the hardest-working organ in the body. It has three important functions to perform. It has (1) to secrete bile, (2) to store up sugar in the form of glycogen, and (3) to manufacture urea and pour it into the blood for the kidney to eliminate. These are all very complicated processes, but I mention them in order to inspire you with the proper respect for the liver as a very important and very busy organ.

Babies often suffer from jaundice. This jaundice is, however, in most cases quite normal. It is called the "physiological jaundice of the newly born," to distinguish it from pathological jaundice. It depends on certain changes in connection with the altered circulation of the baby's blood after it starts life on its own account, and is not due to any obstructions which prevent the bile flowing out of the liver into the intestines and so leaving the body with the fæces or stools.

It is the bile which gives the fæces their characteristic colour, and this fact is of importance, because it is of diagnostic value in determining the seriousness of the baby's jaundice.

The mother often feels nervous when she has a bright yellow baby, and the neighbours frighten her with remarks

on the subject, but as long as the stools are as yellow as the baby there is nothing to worry about. It generally passes off in a few days.

The great point is to keep the baby warm, and on no account to let it get chilled, particularly when it is being washed. You will notice that the baby looks much yellower when it is cold. Babies are more easily chilled than we are, because they have, in proportion to their bulk, a much larger skin-surface than we have, and lose more heat through radiation.

In real jaundice the stools are clay or putty-coloured, and very dry. The urine stains the linen yellow, with a well-defined margin round the stain, and the white of the eye may also be a deep yellow. When these conditions are present, the child should see a doctor without delay.

Why does a baby cry? There are many answers to this riddle. A very ill baby does not shriek loudly. When a baby cries lustily, it may be due to a variety of little discomforts. Very often it cries because its feet are cold. It does not know that that is why it is crying, but warm its little blue toes in front of the fire, or pull off the tight little wet socks, and it soon stops. Or it cries because it is too hot, or it is thirsty, or it is lying in an uncomfortable position, or its clothes are too tight, or it has flatulence, or stomach-ache. Sometimes it cries because it is bored, and thinks that a good way of passing the time. A little energetic crying occasionally is quite healthy lung-exercise for the baby. Metabolic interests are thereby promoted in the same manner as when we yawn or stretch ourselves, both of which are reflex actions arising from involuntary efforts to throw off the products of fatigue.

Many mothers regard the breast or the bottle as a panacea for all baby woes, which is a great mistake. Unless it is feeding-time, all other remedies must be tried

first, and very often you can succeed in making the baby quite happy again by warming its toes, giving it a clean, warm diaper, rearranging its clothes, or giving it a little plain, boiled water to drink. A baby's flatulence is often relieved by a few teaspoonfuls of *warm* water, and in the hot weather babies love a drink of cold water. But the water must always be boiled and cooled. They often get their mouths parched and dry with screaming, and then a little drink acts like a charm. Many babies need a few teaspoonfuls of *boiled* and *cooled* water every day. It is beneficial to them in many ways.

A baby's feet should always be kept warm. Nothing is worse than to leave soaking, clammy, woollen shoes on its feet. No wonder it is unhappy! It is not the sort of thing we could bear cheerfully ourselves. I remember, in "Cranford," dear Miss Matty reading the superscriptions on her parents' letters, so neatly docketed by Miss Deborah, and finding one with this written on it: "Letter of pious congratulation and exhortation from my venerable grandfather to my beloved mother on the occasion of my own birth. Also some practical remarks *on the desirability of keeping warm the extremities of infants*, from my excellent grandmother"!

I attach great importance to "the desirability of keeping warm the extremities of infants," and have always found that the babies thoroughly agreed with me on this point.

Colic, flatulence, constipation, and diarrhœa are frequent disorders among babies. Generally speaking, constipation is the lot of breast-fed babies and diarrhœa of bottle-fed babies. Neither condition must be allowed to go on unchecked. Most babies who are inclined to be constipated do very well if they are given a teaspoonful of pure olive oil every night, and another in the morning,

if necessary. It is good for them in other ways, particularly in winter, as it gives them warmth, and, if early accustomed to it, babies tolerate oil very well. Cod-liver oil is better still, and is now as cheap as olive oil; but it must be of good quality. The constipation of breast-fed babies may be due to lack of sufficient fat in the mother's diet.

Colic may precede diarrhœa. In colic the abdomen is generally hard and evenly distended—like an inflated child's balloon. The child gives sharp, piercing cries, and draws up its legs. Colic may be due to flatulence, or even to cold feet. Generally it subsides on applying hot flannels to the abdomen and warming the feet, and a little soap-suppository will relieve the flatulence. A few teaspoonfuls of warm water will comfort the child, but *on no account should the mothers give their babies soothing-powders or mixtures*, whatever the trouble may be. If the colic does not soon respond to simple measures, the child should be wrapped up warmly and taken to a doctor. No food should be given until the abdomen is quite soft.

Diarrhœa should always be taken seriously, and mothers should never "wait to see how the baby gets on in a day or two" before seeking medical advice. Diarrhœa we will speak of later on.

Sometimes the mothers tell you that the baby's cord "sticks out." That also should be properly attended to, as a faulty retraction of the cord may lead to a rupture, or, in other words, an "umbilical hernia." A protruding navel is also troublesome, because it is subject to friction, and may excoriate. Sometimes the cord has a little granulation-tissue growing in the centre—what is known as "proud flesh." This should soon be attended to, and is easily righted. The great point to insist upon is *clean-*

liness and *dryness* of the affected part; septic (or dirty, poisonous) inflammation of the cord is a very serious condition, and should never be allowed to occur.

Enlarged breasts may occur in infants of both sexes. A certain amount of secretion of milk in the breasts of the newly born is not pathological, and has been known to persist until the third month. It is called in England and Germany "witches' milk." It is ordinary human milk, containing exactly the same constituents—proteid, fat, sugar, and salt. It is of no importance, and, if left alone, may disappear in eight or ten days. It begins in the second week of life, and is attended by a marked swelling of the breasts.

But, although so harmless in itself, it may give rise to very severe trouble if any interference takes place. Unfortunately, the ignorant but well-meaning are stimulated by the sight of the secretion to squeeze the breasts, or to rub them with their favourite medicament, camphorated oil—probably, too, with dirty fingers. This they call "breaking the nipple strings"—whatever that may mean.

This is really an excessively dangerous proceeding. It generally leads to inflammation of the breasts—mastitis—and may even end in an abscess, involving the glands in the armpit. In the case of a girl this may have far-reaching consequences. The nipple may be involved, or, after healing, the abscess may leave extensive scar-tissue, and this may prevent subsequent development of the mammary glands, and when the girl grows up she may not be able to suckle her own children.

Even without active interference, the breasts sometimes swell owing to the congestion resulting from pressure. The pressure is supplied by the hard drill binders that women are so fond of winding round and round their unfortunate

babies. They say it is "such a support to their little backs." Babies should never wear tight clothing of any sort, and they want plenty of room for kicking and breathing. As for dirt getting in, one must always remember that where there is an opening for any secretion to flow out, there is an opening for dirt to get in and to lead to the formation of purulent matter.

The breasts must be copiously and gently washed in plenty of warm, soapy water, carefully dried, and dusted with a little boracic powder, and then covered with a soft pad of cotton wool. But the drill binder, which is like corrugated cardboard, must be discarded.

Any discharges from the bowel streaked with blood or containing blood clots, or the appearance of black, tarry stools, must be at once reported to a doctor. Any hæmorrhage from the bowel is a very serious condition in the case of an infant.

Sometimes babies get painful sores on their lips or at the corners of the mouth. One does not wonder at that. A baby a few months old will gnaw anything it can get hold of, and its mother often gives it a hard strip of crust to bite. In the intervals of biting the crust, the baby rubs it about on the floor or table, and then puts the sticky, dirty crust placidly back into its mouth. The hard crust sometimes cracks the delicate skin of the lips, particularly at the corners, for babies always gnaw things at one side of their mouths.

Babies are very prone to abscesses, and I have known abscesses form from this very cause. An abscess means deep suppuration, and suppuration is always an exhausting process, and should be checked as soon as possible.

You cannot prevent babies putting things into their mouths, but they should not be allowed to put sharp-cornered things between their lips, and what they put in should, if

possible, be clean and harmless. Sharp-edged spoons are very harmful. I need not tell you that a so-called "comforter" is an admirable vehicle for introducing germs of all sorts into the baby's mouth and setting up vomiting, diarrhœa, and other evils. "Comforters" are largely responsible for thrush, and thrush in breast-fed infants may lead to sore nipples and abscess in the mother's breasts.

So you see the baby's "comforter" may be a source of grave discomfort, if not of danger, to both itself and its mother. The evils associated with "comforters" are legion, but those affecting the mouth, throat, stomach, and bowels are the most serious. One experienced authority says, "Catarrhal and parasitic stomatitis and ulcerations about the gums and palate are often met with, due to friction of the rubber teat and micro-organisms introduced by its uncleanness." Another says, "When the use of the teat is carried, as it often is, into the second and third year, one may find caries of the milk teeth." "Tonsilitis may be started at an early age, deafness may be induced from inflammatory changes in the mucous membrane near the orifices of the Eustachian tubes at the back of the mouth, the upper jaw fails to develop, and the teeth become cramped for want of room" (Goodhart).

"Apart from its mechanical effects upon the jaws and teeth, its uses are obnoxious and uncleanly, for it introduces into the child's mouth dirt and micro-organisms, and causes an abnormal secretion of saliva detrimental to digestion."[1]

It is a matter of great difficulty to convince busy mothers of the great evils following in the train of

[1] "The Rubber Teat and Deformities of the Jaws," by T. F. Pedley, M.D. (*British Medical Journal*, Oct. 20, 1906, pp. 989-94).

"comforters." Their one idea is to "keep the baby quiet," and they think any means justified which serves this desirable end. They may be taught to grasp the fact that a comforter "may spoil the shape of the baby's mouth," but they think the interests of asepsis are sufficiently served by tying the comforter round the child's neck to prevent it falling on the floor, or by wiping it on their own aprons if it does fall down.

I know a case where a baby swallowed the teat, which had broken off at the neck. The rubber might have proved fairly harmless and passed through the baby's interior comfortably, but these teats are generally stuffed out with a little pad of wadding, and this proved extremely refractory and gave rise to severe intestinal disturbance.

One mother herself told me that "she did not hold with them comforters," because she knew a baby that "got its little inside poisoned" by the wet teat getting the red dye from the baby's dress on it. I used to tell these stories as warning examples.

Thrush (parasitic stomatitis) owes its popular name to its supposed resemblance to the white speckled breast of a thrush, and is caused by a minute vegetable organism belonging to the fungus order. It produces an eruption of small white spots on the tongue and on the mucous membrane lining the mouth.

The seeds, or spores, of this fungus are constantly floating invisibly in the air, just like those that produce the souring of milk. Spores are always much more resistant than the organisms which produce them, owing to a protective envelope which they possess. They represent the organism in a "resting stage," and they will wait with a persistence and a patience worthy of a better cause until a chance of effecting an entrance somewhere is afforded to them.

The infective organism of thrush belongs to the yeast family, and bears the imposing name of *Saccharomyces albicans.* Like all yeasts, it causes fermentative changes, and may thus lead to digestive disturbances.

It is easily preventible, particularly as the spores cannot gain a foothold on a perfectly intact membrane.

That is one reason why it is so very important to observe great gentleness in cleaning the baby's mouth, as any abrasion immediately affords a convenient lodgment for the fungus.

Thrush may be conveyed to the child's mouth from a dirty nipple as well as a dirty teat. Breast-fed babies often contract thrush. Again, if the baby has thrush, it may infect its mother's nipple, and this may eventually lead to the formation of an abscess.

There is, thus, every necessity for keeping both the baby's mouth and the mother's nipple clean.

There is a wide-spread belief that all babies are bound to have the thrush. The mothers tell you quite triumphantly, "It's *had* the thrush!" as if it were a matter of congratulation to have got over it—like teething. It is difficult to disabuse them of this idea.

The treatment is entirely on lines of cleanliness and disinfection, and care must be taken not to increase the mischief by rubbing about in the baby's mouth too vigorously. If the white spots are rubbed off, bleeding points are left, which are very open to further infection. Careful washing out with clean strips of rag soaked in boracic lotion is preferable to the classic application of borax and honey. The honey is used only as a vehicle. Glycerine in combination with boracic powder acts beneficially, as it is healing as well as cleansing. It can easily be mixed in a scalded egg-cup with the scalded handle of a teaspoon. I always suggest an *egg-cup*, because it pre-

sents less surface for dust than a saucer. It should have a little cover made of clean paper, and the mother should be implored *not* to dip a dirty finger into the egg-cup and give it to the baby to suck!

A pinch of bicarbonate of soda in a couple of table-spoonfuls of boiled water is also a good lotion for washing out the mouth. Rubber teats of all sorts, those used for bottles and nipple-shields as well as "comforters," are extremely liable to carry thrush organisms.

Sometimes the mothers ask me how to make boracic lotion. It is very cheap, and I tell them to get a few pennyworths of the boracic acid powder, put it into a clean quart bottle, and fill up the bottle with cooled boiled water until it is full, and then to go on filling up the bottle until all the crystals are taken up. In this way you get a saturated solution. In using it, a little boiling water may be added to the lotion to warm it.

Dentition is a physiological process, and, beyond a natural amount of fretfulness due to the irritation in the gums, ought not to cause serious disturbances. If, therefore, a child is ill when it is cutting its teeth, it must be taken just as seriously as at any other time, and not be treated casually as "only teething."

The actual formation and development of the teeth takes place quite early in fœtal life—from the seventh week, in fact. We are actually born with two sets of teeth in our heads—twenty milk teeth and twenty-four permanent ones. At seven months another four permanent molars begin to form, and during the third year the "wisdom teeth" germinate. For a short period of our existence—from the formation of the last molars to the shedding of the first milk teeth—we actually have fifty-two teeth in our jaws at the same time, though only twenty of them have erupted.

The milk teeth have no roots when they are shed, the roots having been gradually absorbed by certain large cells, whose business it is to remove them.

Babies begin to cut their teeth about the sixth month. The lower central incisors are the first to be cut, then follow the upper central incisors, the upper lateral incisors, and the upper first double teeth, or molars, and the corresponding teeth in the lower jaw, and at the end of a year and a half the baby should have twelve teeth—six upper and six lower. During another period of eighteen months the four canines, or eye-teeth, appear, and, finally, the last molars, which complete the twenty milk teeth.

The appearance of the teeth has a physiological significance which is very commonly ignored in baby-feeding.

The teeth are digestive organs, and it is their physiological function to prepare *solid* food for its entrance into the stomach. This they do both mechanically and chemically—mechanically, by making it conveniently small to swallow, and chemically, in the case of starchy or farinaceous food, by retaining it, during the process of mastication, sufficiently long in the mouth to allow of its being acted upon by a ferment called ptyalin, which is secreted by the salivary glands. This ferment has the effect of reducing insoluble starch into soluble sugar.

It is obvious, then, that before the eruption of the teeth, *no solid or pappy* and *no starchy food* should be given. There is no starch-splitting ferment in the stomach, and the starchy food that escapes the action of the ptyalin in the mouth must wait until it can be acted upon by the pancreatic juice in the intestine.

A baby's *cold* is never to be taken lightly. If the baby has a "cold in its nose" so that it cannot breathe with its mouth shut, its respiratory system is much more easily accessible to the invasion of micro-organisms, such as the

pneumonia bacillus or the whooping-cough bacillus. By not breathing through its nose it loses the protective action of the nasal mucous membrane, which acts as a kind of intercepting filter and destroys the bacteria which come into contact with it.

"*Spasmodic croup*" must not be confounded with croup associated with a pathological condition of the lung. Spasmodic croup is due to a nervous disturbance causing a closure of the vocal cords, and thereby giving rise to the characteristic crowing noise which the child makes in its efforts to open its larynx and admit air into its lungs. It is a very alarming condition to mothers, but generally passes over quickly. It frequently occurs suddenly at night. Children suffering from it should see a doctor, as it always denotes weakness somewhere and needs wise treatment. The spasms are often relieved by placing a hot sponge over the child's throat, or by dashing a little cold water in its face, which will make it gasp and relax its vocal cords.

I can only briefly allude to vaccination, and it is not within my province to discuss the ethics of vaccination.

The methods of inoculating small-pox lymph have undergone elaborate modification since Edward Jenner, in 1796, inoculated his first case with virus taken straight from the pustule of a cow suffering from the cow-pox, or vaccinia. In those days it was not called vaccination, but cow-poxing.

Formerly, the arm-to-arm method was used. Unless rigid antiseptic precautions were observed, other germs as well as the vaccinia germ were inoculated. The Local Government Board now prescribes the use of glycerinated calf-lymph—*i.e.* the clear serum drawn from the primary eruption vesicle of a calf which has been inoculated with small-pox.

Babies are thus inoculated with the disease after it has been attenuated by being passed through the body of a calf, and the glycerine is a convenient agent for destroying deleterious germs; for instance, the micro-organism of erysipelas is unable to withstand exposure to a 50 per cent. solution of glycerine.

It is quite a heathen idea that the baby must have a very "bad" arm as an evidence of successful vaccination. It is advisable that the arm should be inoculated in four places, but vaccination is scientifically and successfully accomplished by just scratching through the finest layer of the skin, and not by deeply ploughing into the tissues and causing troublesome and dangerous ulceration.

A vaccinated arm should vesicate or blister, and there may be a slight halo of inflammation round each vesicle, but ulceration is out of place.

In the after-treatment the essential points are: to keep the arm protected from dirt, to keep it dry, and to avoid friction. The scabs should be left in peace until they drop off, as they act as protective covers while the new tissue is forming underneath. About the twelfth day any inflammation present is at its worst, and then generally subsides. Vaccination should not be undertaken when the child is teething, or otherwise out of sorts, and the environment should be as clean as possible under the existing circumstances.

In poor houses babies are often brought into close companionship with that favourite friend of the poor, the domestic cat. This proximity is not without danger, for the dirty slum cat is often a vehicle for the transmission of parasites. The danger arises from the fact that cats may harbour certain minute tape-worms, and that the eggs of these may find their way into the child's alimentary system and give rise to small "bladder-worms." Cats may also carry

ringworm spores in their fur. These may be remote dangers, but it is always desirable to discourage babies from fondling cats; and the same applies to dogs, as these animals' coats are peculiarly prone to carry infection and parasites.

Weaning, and Diet after Weaning

Weaning should be gradual and should not, if possible, be undertaken during the dangerous diarrhœa months—July, August, September—nor when the child is cutting troublesome teeth.

Physiologically, it should be begun at the end of the ninth month. After that, a variety of foods may be introduced into the baby's bill of fare, but cow's milk should always form its staple diet.

It is *then* that we want milk depots for babies—not before. The ideal thing would be to have milk depots for nursing mothers, and give *them* the milk to drink!

After a baby is weaned it should have a varied diet, including very lightly boiled eggs, of which it should have the yolk mainly, as it tolerates this very well indeed, and the yolk, being peculiarly rich in iron, is very beneficial to the growing baby; further, it may have potato soaked in gravy, stale breadcrumbs soaked in gravy or boiled milk, rice or other cereals thoroughly cooked and mixed with milk, and at times a little fine pulp from a baked apple, sweetened with a little sugar. The potato should be baked in its jacket, and then scraped off the peel and mixed with a little butter, gravy, or bacon dripping. Bacon-fat is very good for the baby, but the mothers are very fond of giving the babies a piece of bacon-rind to suck, or a pork-chop bone, or a bit of haddock, and all sorts of odds and ends of that sort. It is very difficult to make them understand

that a baby's digestive apparatus differs in the least from their own.

If you ask an out-patient mother on what she feeds her child, she will frequently tell you, "Oh! the breast, and a bit of what the rest of us has."

When the mother of a baby suffering from diarrhœa and vomiting saw us in the hospital feeding the baby on a few spoonfuls of peptonised milk and water, she was quite disgusted at our stingy ways, and said with indignation, "Is *that* all 'e's going to 'ave? Poor little thing! and 'e's such a one for 'is tea, too!" They think nothing comes amiss to a baby!

I want to beg you to urge the mothers to guard with covers of paper, muslin, cotton-net, or wire-gauze all the food that the precious baby is going to have—particularly in summer, when dust and flies abound. Flies have very filthy habits, and the catholicity of their taste in food knows no bounds. They are equally happy feasting on putrid meat, stale fish, rotten fruit, fæcal material, or condensed milk. They swarm inside our sugar-basins and commit suicide in our milk-jugs, and avenge their death by poisoning the milk with evil germs. Never let a baby have any milk from which a fly has been fished out without first boiling that milk. Dust is equally pernicious, and if the place is dusty, milk and other foods should be protected from it by coverings.

Weaned babies need never start bottles for drinking their milk. Even a child three months old can be taught to drink from an ordinary cup, and it is much safer, because it is so easily sterilised. The little flat or boat-shaped feeding-cups answer very well for this purpose. A child a year old can quite well get through two pints of milk a day, including the milk used for its milk-pudding

and bread-and-milk; but I am afraid very few babies get a quarter of that amount.

At the end of the first year the baby ought to weigh three times the amount it weighed at birth, and our standard baby should weigh 21 lb. on its first birthday.

LECTURE VI

THE COMMON DISEASES OF INFANTS AND THEIR RECOGNITION

We are going to-day to briefly discuss the common diseases of infancy and how to recognise them.

The great point is to recognise them at a sufficiently early stage to admit of energetic remedial measures being taken.

Rickets and *scurvy* are the two pathological conditions most intimately associated with babyhood, and they are essentially diseases of nutrition.

Their exact causes are not known; but rickets is associated primarily with lack of sufficient *fat* in the diet, and scurvy with lack of *fresh* food.

Both are common among hand-fed children and very rare among those breast-fed. At the same time, the breast-milk of underfed mothers may be so deficient in fat as to induce rickets in the babies.

Both are limited to a restricted period. Unfortunately, the results in the case of rickets are not limited to the first two years, but may persist through life.

Rickets can generally be diagnosed by certain characteristic symptoms, the most important being due to anatomical changes in the bones.

When a child is born, its long bones are more or less rods of cartilage. Now, the changes by virtue of which

cartilage is transformed into bone are most complex and elaborate, and would require a great deal of explanation. The essential point to realise is that from certain centres of ossification the bony substance bit by bit works its way into the cartilage, and gradually the cartilage is absorbed, leaving bone in its place. Cartilage is not, as such, *changed* into bone, but disappears before an invasion of bony material which takes the field held, in the first place, by the cartilage cells.

In rickets the state of affairs is as follows: the cartilage makes an excessive preparation for the process of ossification, and nothing satisfactory comes of it. In other words, in spite of the elaborate framework of cartilage, there is an insufficiency of lime salts, or bone-material, deposited to promote the necessary calcification of these structures, and consequently we get soft cartilaginous enlargements, chiefly at the joints, in the form of knobs and bosses.

The question is: why is there an insufficiency of lime salts in the case of hand-fed infants? Not because there is an insufficient quantity in the cow's milk itself, for cow's milk is richer in lime salts than human milk. Human mik contains only $\frac{7}{20}$ per cent. of lime salts, and cow's mik $1\frac{12}{20}$ per cent., because $\frac{7}{20}$ per cent. is sufficient for building up the bones of a baby, but more than four times the amount is required for building up the bones of a calf.

The generally accepted theory is that the disease is not due to an insufficient amount in the food itself, but to the inability of the disordered digestive apparatus to absorb the lime salts into the blood-stream, and also that this inability is in some way connected with a lack of proteids and, above all, with the lack of *fat* in the food supply.

It is therefore absolutely useless to increase the amount

of lime salts in the child's diet, for the lime salts in excess of what can be assimilated will merely be excreted with the fæces.

If either the proteid or the fat in the child's diet does not come up to the percentage in human milk, then, by increasing the deficient constituent to the proper figure, an improvement in the child's condition will be effected. The deficiency in fat is apparently the most important detail. By why rickets should arise from this deficiency, and why the lack of fat and proteid should lead to inability on the part of the child's digestive organs to utilise the lime salts supplied to it, no one has yet been able to explain.

Rickets is very uncommon in breast-fed children, unless the nursing has been unduly protracted, or the milk is very poor—especially in fat, as in the case of an underfed mother, as we said before.

Besides faulty nutrition, unhygienic surroundings and particularly lack of sufficient air-space foster rickets.

Generally speaking, rickets is easily diagnosed by the typical large head with bulging forehead, the narrow chest, "beaded" ribs, distended abdomen, open fontanelle, late appearance of teeth, and the knobby joints, with curvature of the long bones.

Normal bone contains roughly one-third organic or animal matter and two-thirds inorganic or mineral matter. It is the mineral matter that gives bone its characteristic hardness.

In rickets the proportions are reversed. There is a preponderance of organic matter and only one-third inorganic matter.

The initial stages of rickets may be very insidious, and the condition well established before it is easy to recognise it.

The bony irregularities may be quite insignificant, and the most marked symptom may be the flabbiness of the muscles, which may almost suggest paralysis. But in paralysis there is generally some lack of motor-power, and often lack of sensation as well.

The stools of rickets are generally dry and constipated. The constipation is due to lack of tone in the fine muscles lining the intestinal walls, inducing a failure to contract and push the fæcal contents of the bowel onwards.

Rickety children are nearly always anæmic, and many of them are white, fat, and flabby. The fat is derived from the starchy food containing an excess of sugar which is generally their staple diet.

They are apt to be nervous and fretful, and are restless at night.

They are very prone to inflammation wherever there is a mucous surface, so that very slight causes may induce inflammation of either the mucous membrane of the respiratory tract or of any part of the alimentary canal, resulting in severe bronchitis or catarrhal diarrhœa.

Sweating about the head during sleep is a pronounced symptom. All or any one of these symptoms may be present, but a combination of several of them should arouse vigilance, and the advice that the child should have medical supervision should always be most urgently given.

The absolute necessity for the faithful carrying out of the regulations given with regard to the diet should also be urged.

Rickets is not a fatal disease, but it is a condition which breaks down the natural defences against diseases and renders the child an easy prey to their invasion. The bone-disturbances may also result in permanent deformity.

For treatment, it is absolutely necessary that the child

should be placed under proper medical supervision, and the curative agents are essentially a regulation of the diet, the administration of cod-liver oil, and fresh air and sunshine —when they are procurable.

Scurvy may develop from any kind of artificial feeding, but is chiefly induced by a diet of condensed milk, sterilised milk, or proprietary infant foods, even when these are given in proper proportions and are of good quality. It is quite apparent that some highly essential element is lacking in the diet. Scurvy is a disease that responds to a change of diet in a marvellously short time.

The pathology of scurvy is chiefly associated with the blood-vessels.

It does not give pain to a *rickety* child to be handled, but a child suffering from scurvy screams if it only thinks you are going to touch it. What has happened is that there is a pouring-out of blood between the bone and the fine vascular membrane called the periosteum which covers it. This causes a bulging of the periosteum, and this again exercises a pressure on the underlying nerves, so that the slightest touch agonises the poor baby.

Great tenderness in the legs is the most characteristic symptom. There may also be changes in the mucous lining of the mouth, and the gums may be a deep purplish colour and easily bleed.

Paralysis is often suspected, but there is no real inability to move, only disinclination owing to pain.

There is not necessarily a rash, but sometimes small red spots occur, which are due to minute hæmorrhages under the skin

Scurvy is essentially a disease of breaking-down blood-vessels, and the symptoms are all due to this fact.

The cure is obviously to change the diet, and to supply the essential factor that has been lacking, and which

appears to be *fresh raw* food of some nature, whether it be raw milk, raw meat-juice, or raw fruit-juice.

Rickets and scurvy are the two most weighty disorders of childhood, though one hears comparatively little of scurvy.

The points to remember about these two disorders are their constant relation to diet, and that, though various other errors in the diet may be the responsible causes, the two most characteristically associated with rickets and scurvy are the following: in the case of *rickets*, the lack of proteid and fat, but chiefly fat; and in the case of *scurvy*, the lack of raw food.

Both diseases take a considerable time to develop and produce definite symptoms, and it is, therefore, essential that a mother should at a very early stage be well advised as to the nourishment of her infant in order to avoid the chance of either of these diseases developing later on.

Intestinal Disorders

A baby's stomach is to a large extent merely a reservoir into which the milk is received, and out of which it passes gradually into the intestine.

The proteids in milk undergo partial digestion, and the milk remains in the stomach sufficiently long to clot or coagulate. This process of coagulation is effected by means of a ferment called "rennet," which is found in the stomach of all young mammals. The physiological importance of milk-clotting is unknown.

Now, the clot formed by human milk in a baby's stomach is so soft that it readily undergoes solution.

Cow's milk, however, unless properly diluted, coagulates in firm, compact masses, and very often finds its way out of the child's stomach in these tough, leathery masses,

and it is left for the intestines to deal with this refractory substance.

A baby's small intestine is only 9 feet long, whereas the intestine of an adult measures 20 feet. It is here that the fats are digested and absorbed, the bile salts supplied by the liver assisting largely in the process. We mentioned before what an important organ its liver is to a baby.

The large intestine, which is 4 to 6 feet long in an adult, and only $1\frac{1}{2}$ feet in a baby, has very little absorptive power.

The pressure of hard, unyielding clots in the intestine is apt to produce convulsions. That is why rickety children are the ones most prone to "fits."

Convulsions are generally due to reflex causes. That is to say, the originating source of mischief is not in the brain itself, though the actual disturbance known as a convulsion proceeds from the brain.

As Huxley happily put it, "a reflex action is an action you do without reflection." For instance, if a speck of dust gets into your eye, your hand involuntarily goes up to your eye, or you instantaneously blink.

It is like a telegram to the brain with the reply paid. The sensitive surface of the eye telegraphs to the brain that a foreign body is disturbing it, and the brain sends off a nervous discharge, telling the eyelid to blink in order to remove the intruder.

But in the case of "convulsions" or "fits," the brain, on receiving the information that there is a local irritating cause somewhere, sends off a sudden and *abnormal* discharge of nervous energy—in other words, the reply to the telegram is an erratic and exaggerated one, resulting in convulsive movements instead of reasonable action.

The local irritating cause may be constipation, flatulence,

a sudden chill, an acute rise of temperature, or the irritation of the gums during teething, but is very often a lump of hard curd pressing on the child's intestinal mucous membrane.

Vomiting and Diarrhœa

Ordinary vomiting may arise from over-distension of the stomach, and then may be regarded as a safety-valve; it needs no treatment except to diminish the quantity given, or to prevent food being taken too hastily.

Persistent vomiting is a danger signal. It may arise from some intestinal obstruction. Vomiting, however, from no discoverable digestive cause may indicate some cerebral trouble; in this case the tongue is quite clean and healthy-looking.

Vomiting may also herald the beginning of some acute infectious disease. It is likewise largely associated with diarrhœa.

Diarrhœa may be the natural consequence of digestive disturbances due to over-feeding, or to improper food, or may result from a chill. An artificially fed child may easily be over-fed, but it is not so easy to over-feed a breast-fed child.

But there is another form of diarrhœa which is a directly infective disease. This form is epidemic, and is at its worst when the summer has reached its culmination-point of heat, associated with dry weather.

In fighting against epidemic diarrhœa, the observance of the strictest cleanliness is of the most urgent necessity. Where the food is not breast-milk, every possible source of contamination of the food itself and of the utensils used must be taken into account and neutralised by preventive measures.

The whole subject of epidemic summer diarrhœa is closely associated with Infantile Mortality, and if I dismiss it in a few words, it is because I am quite sure that you must all have heard and read a great deal about it, and in the short time at my disposal there is little that I can say that has not been very circumstantially dealt with by those of profound experience in this very important subject. But I want to impress upon you that it is a very important subject indeed in its bearing on Infantile Mortality, and that you ought to know as much as you can about it.

I will not trouble you with figures and statistics, but it is an established fact that breast-feeding is an almost invulnerable safeguard against the ravages of infectious diarrhœa—almost, but not quite.

It is quite easy to imagine how the hand-fed infant may have its food-supply contaminated, only taking sources of domestic infection into account. Think of the dust which abounds and of the flies which swarm in the narrow streets in poor quarters, where windows and street-doors are open to admit as much air as possible!

Tyndall had a theory which is so picturesque in its wording that it is easy to remember. It is called Tyndall's "raft theory," and he held that the minute particles of dust floating in the air, which look so exceedingly pretty when moving in a shaft of sunlight, afford very substantial "rafts" for germs to travel about on and make aerial voyages.

As long as the "rafts" with their undesirable passengers travel in the air they are harmless; but when these rafts settle down on the teats of babies' bottles, on babies' "comforters," jugs of milk for the baby, open tins of condensed milk, and so on *ad infinitum*, we get quite a different story.

Condensed milk lends itself particularly to domestic

infection. To begin with, the tin is often opened with an unspeakably dirty tin-opener at the shop where it is bought. It is then carried open through the dusty streets, and is often left standing open on the dresser or any other convenient place, and is highly attractive to flies.

If there is a baby next door that has infective diarrhœa, and if any of the infected stools have been exposed to the visits of flies, there is a very obvious path of infection opened.

Impress two essential points on all the mothers you visit in the hot months. Tell them to cover up all food, so that neither dust nor flies can get at it, and, where there is a child suffering from diarrhœa, urge them to observe extreme conscientiousness in dealing with soiled diapers.

As a *temporary* measure the soiled diapers should be at once immersed in cold water. As Naegeli wrote: "Liquids or damp substances do not, with ordinary air currents, give off micro-organisms to the surrounding air." It is when infectious discharges *dry* that particles are given off into the air and spread infection.

But though anchoring down the organisms by immersion in water will prevent dissemination through the air, it will not prevent flies from crawling round the edges of the infected fluid and carrying the infection elsewhere. Even if the receptacle is covered, it has itself become contaminated.

When one considers the terrible infantile death-rate effected through the ravages of epidemic diarrhœa, and the great probability of the stools from the disease disseminating the infective organisms unless properly dealt with, one cannot urge their thorough disinfection too strongly.

In defensive warfare against the invasion of micro-organisms the same first law holds good as in military

engineering—that "no fortress is stronger than its weakest point." In the case of typhoid, the stools are admittedly a source of danger to the community at large, and are treated as such. Surely the same precautions should be taken in the case of infective diarrhœa stools! In the latter case the chances of dissemination are enormously increased owing to the suddenness of the attack, the frequency of the stools, and the prevalence of the disease in crowded poor homes, where the domestic equipment is often appallingly inadequate, and where there is every chance afforded for the stools spreading contamination. The baby's stools may soil the floor or the bed, there are no proper means at hand for disinfecting the soiled diapers, nor is a special receptacle always set apart for them, and families living in one-roomed dwellings have not always access to the "copper" for boiling clothes.

Where it is at all possible in such cases, strongly advocate the boiling of the baby's diapers and the scalding out of receptacles. Preach the doctrine of fresh air and sunlight, soap and boiling water, and if you succeed in inducing your hearers to pin their faith to these simple but powerful agents, you will have gone a long way on the best of all lines—*preventive* lines.

I will say absolutely nothing about the treatment of infantile diarrhœa, because it is such a deadly disease that it cannot be sufficiently urged that the only right treatment is to take the baby *at once* to a dispensary for proper advice.

Only, in the meantime, keep the baby warm, and withhold all food except a little boiled water to drink.

Sometimes "albumen-water" is ordered for the baby during the attack. This is simply the raw white of egg and plain boiled water. The white of egg and ten or twenty tablespoonfuls of cooled boiled water are shaken up

together in a clean bottle, and a few teaspoonfuls at a time are given to the baby. The boiled water must be cooled first or it will coagulate the egg-albumen.

Wasting

Wasting as a disease is differentiated from wasting as a symptom. As a disease it is known as Marasmus, and is apparently a vice of nutrition, either congenital or acquired through destitution and consequent malnutrition.

Such marasmic children generally die suddenly of atelectasis, or collapsed lung, or of convulsions, or bronchitis; they are, in fact, carried off by the first illness of any nature that overtakes them, as their resisting power is nil.

Diseases of the Respiratory System

The commonest are bronchitis, pneumonia, and whooping-cough.

Babies are very prone to diseases of the respiratory system because they are so easily chilled.

The skin is an accessory organ of respiration, and a baby has more skin-surface in proportion to its size than a grown-up person. In the same way, a very thin person has more skin-surface than a stout, bulky person. In a growing animal, as the square is to the cube, so the skin is to the whole bulk. In this way, bulk rapidly gains the advantage, and, consequently, we present proportionately less and less surface the bulkier we grow.

Bronchitis and pneumonia are allied diseases. In bronchitis we have an inflammation of the fine, hair-like tubes ramifying all over the lung; generally it is in the larger bronchial tubes, but in infants it is apt to spread to the

very finest, and develop into capillary bronchitis, and this form often leads to broncho-pneumonia, which is a very serious matter indeed.

The best preventive treatment is a careful avoidance of draughts, night air, and damp clothing, and the administration of cod-liver oil. The wheezy, difficult breathing will generally make it easy for you to recognise bronchitis when you come across it.

In pneumonia, not only the fine air-tubes but the minute air-vesicles at the end of the tubes are implicated and become filled up until part of the lung becomes consolidated.

Pneumonia is very often very sudden in its onslaught, and the child is obviously ill. Sometimes valuable time is lost while the mother is making up her mind what to do, and after hesitating all day these foolish mothers will bring their babies late at night to the out-patients' department of a hospital.

It is characteristic of infants that they develop diseases very rapidly. It is always advisable to seek proper medical advice for a baby at the very first suspicion of anything being wrong.

Whooping cough is not, strictly speaking, a disease of the respiratory system. It is one of the infective diseases, and, though it may lead to bronchitis or pneumonia, or follow them, often stands quite alone.

Its most pronounced characteristic is a highly irritable condition of the mucous membrane of the respiratory tract, accompanied by a nervous spasmodic cough which occurs in paroxysms. Whooping-cough shows a greater tendency to attack young infants than any other infective disease, and is highly infectious, and may be contracted in the open air.

In very young infants the characteristic whoop is often

absent, but the paroxysmal nature of the cough, the subsequent vomiting, the watery eyes, and the congestion of the veins about the head and neck, causing blueness of the lips and cheeks, sufficiently indicate the real nature of the cough. Convulsions occasionally accompany the disease, and it often causes great exhaustion.

Whooping-cough must always be taken very seriously. During the first year of life there are few diseases to be more dreaded; the younger the infant, the worse the outlook. Even if they do not succumb to it, it predisposes them to tuberculosis. Remember, therefore, to lay great stress on the urgent necessity of keeping babies out of the way of children suffering from whooping-cough. On the first sign of whooping-cough, children should at once be put under proper advice, and the instructions with regard to fresh air and special treatment carefully carried out as far as practicable.

Eruptions

With regard to eruptions I have only a little to say, though the subject is inexhaustible. Infants are very prone to eruptions; and they arise from a great variety of causes.

Want of cleanliness is a very common cause, but digestive disorders, excessive clothing, heat, cold winds, hard water, strong soaps, unwashed flannel, and patent medicines, all have been known to cause eruptions in infants.

As to their treatment, it is impossible to treat them rationally until the cause has been discovered. This should first be removed or rectified, if possible. Very often the eruption then disappears promptly. If not, the child should be seen by the proper person, and suitable

instructions with regard to bathing or lubricating or powdering laid down.

As a rule, skin eruptions respond very quickly to proper treatment. Eruptions which are characteristic of infectious diseases are accompanied by other symptoms of the same disease, and do not come under the head of skin troubles. These eruptions are, of course, very important danger-signals, and should instigate prompt action in the matter of seeking medical advice and of isolation.

Diseases of the Eyes

The consequences of diseases affecting babies' eyes are often so very terrible that no unhealthy appearance of the eyes or eyelids should ever be regarded casually.

No disorder in connection with the eye is trivial, and no pains can ever be too great when employed in curing inflamed or sore eyes in babies.

Sticky, sore, mattery eyelids should be at once attended to, and the keynote of the treatment is *cleanliness*—not the daubing on of ointments.

I have often taught poor mothers how to bathe babies' eyes. Teach them never to put the same rag in both eyes, never to rub the eyes, and to burn all the bits of rag after use. By cutting the material into minute bits, a little clean linen goes a long way. The baby's head should be held tilted first to one side for one eye, and then to the other for the other eye, and the lotion, or boiled water, should be squeezed out of a soaked bit of cotton-wool and should trickle gently over the edge of the eyelids, letting it run out at the *outer* corner of the baby's eye into a dish placed underneath to catch it. Then the eyelid must be very gently dabbed to remove the loosened crusts, and very

lightly dried. The dish must not be used for anything else, and must be scalded after use.

I know one poor mother who cured her child's eye of a terribly infectious condition entirely by anxious care and unremitting attention to these details, and, as she lived in one small room with her husband and three children, and was almost destitute of means, and as she kept the infection from spreading to any of the others, it shows what can be done in face of almost insuperable difficulties, with maternal anxiety and conscientious obedience.

Paralysis

Paralysis in infants may be congenital, and may not be observed until the child reaches the proper age for walking. What is commonly known as infantile paralysis generally displays itself by the wasting of some limb. It is a difficult condition to treat, and much may be done by recognising it early.

Mental deficiency, again, may be unsuspected until the child is about two years old.

In normal babies the anterior fontanelle, or soft skull space, closes absolutely in eighteen to twenty-four months. In either rickets or mentally deficient children the closure may be delayed to a much later period. With mentally deficient children there is generally either continuous apathy or marked fretfulness, but it is a very difficult condition to diagnose and must be left to experienced persons.

* * * * *

This brings my talks with you to a conclusion, and I can now only hope that the little I have had time to say in these six afternoons may be of some practical help to you, and I further hope that it may lead you to go about your work of Health Visiting in the spirit of research, to find out things for yourselves, and to think out practical

remedies of your own. We all see with different eyes and different standards, but what I am sure we are all agreed upon is the necessity for such Health Visiting as is being done, and the great need for a large increase in the number of workers.

As a last word, I should like to say that it is work that is eminently worth doing, and in my own case I can only say that it has given me some of the best times I have ever had in my life. But always remember that *personal influence* is the keynote of success in dealing with Infantile Mortality, not the establishing of milk depots, crêches, and mothers' dinner-clubs, however praiseworthy these objects may be, and however magnificently they may be managed and financed.

The first condition for success is that you should care very much. If you *really* care, you cannot help your influence making itself felt. Admirably managed philanthropic schemes, with beautifully kept books and carefully worked-out statistics, are splendid things in their way; but they leave the imagination of the poor stone-cold unless they are vitalised by that kinship of Nature which only the personal note can awaken.

It is so absolutely true what some one once beautifully wrote: "Yes, there is one thing worth living for—to help to make it all a little more bearable for the others."

In time you will love not only the babies—who wouldn't love babies!—but you will come to the point of feeling a very strong bond of affectionate fellowship with the *mothers* of the babies. Out of the many hundreds I have known, some of them have been the very nicest of women, and have aroused my reverent admiration.

All true women have a maternal instinct—it is one of the best and truest of our attributes, and one of our most primal.

That common instinct should make us feel friendly towards *all* mothers, and wish to help them.

Ruskin wrote some very beautiful words once, which you will find in "Sesame and Lilies": "There is a true Church wherever one hand meets another *helpfully*, and that is the only holy or Mother Church which ever was, or ever shall be."

APPENDIX

St. Pancras Borough Council

Public Health Department

ADVICE TO MOTHERS

The St. Pancras Borough Council find:

(1) That a number of infants are born before full time and die soon after birth;

(2) That a number of full-time infants are born so feeble as to live only a few weeks;

(3) That a number of infants are not suckled at the breast after being born;

(4) That a number of infants who are suckled at the breast for a few weeks are weaned too early;

(5) *That it is cheaper and easier to feed infants by the breast than by hand;*

(6) That it is simpler and wiser to take care of the mother's health, both before and after the birth of her infant, and to improve the breast-milk, than to bring up the baby by hand-feeding, wholly or in part.

(7) That the hand-feeding of infants is generally unsatisfactory, always risky, and in the summer dangerous and often fatal.

In these circumstances an appeal is made to *all* mothers to aid in practising and spreading a knowledge of the following system:

Mothering

The health of the mother is most important of all.

The mother must take care of her health so as to make her

infant strong at birth, prepare herself to suckle her baby, and pay particular attention to the nipples.

Spirits and strong drink must be avoided ; plenty of good, plain, wholesome, nourishing food must be eaten, and the appetite improved by exercise in the open air.

A mother who improves her own health will also improve that of her baby.

When in doubt as to her health or habits a mother should not hesitate to seek medical advice at once.

Suckling

A mother who has properly taken care of her health should beable to fully suckle her baby when born.

She should not be disappointed if the breast-milk is scanty or not *fully* established for two or three days. The regular suckling of the baby will cause the flow to increase more and more.

If she continue to take care of her health she should be able to continue suckling her baby for about nine months.

The best food for the baby is mother's breast-milk alone and without any other food whatever.

If the mother's milk is poor in quality, she should improve it by eating a greater quantity of good, plain, wholesome food, and improve her appetite by more exercise in the open air, and *above all should avoid spirits and strong drink.*

If the mother have not enough milk, the same measures will increase the quantity, and a cupful or two of milk half an hour before suckling will be an excellent help towards this, as *the only way to humanise cow's milk is to pass it through the mother, and not through a machine.*

The nipples should be cleansed and dried each time after suckling.

The baby should be suckled every two hours during the first three months, gradually decreasing to every three hours during the second three and following months. The baby should be awakened for this purpose, if necessary. Also twice in the night during the first month, once during the second month, and in the third month night-feeding should be gradually discontinued. As the feeds are reduced in number,

the quantity of milk at each feed gradually increases. Feed the baby slowly: allow fifteen minutes or more for each meal. Do not rock the baby violently after it is fed. Do not feed a baby every time it cries.

Weaning

When the baby cuts its teeth it is time to think of weaning, not before.

A baby's teeth may be expected to commence cutting between the seventh and the ninth month.

The usual time for weaning is about the ninth month.

Weaning becomes easier and safer if it is delayed until after the ninth month, soon after which the breast-milk should be altogether stopped.

Not until the eighth or ninth month, or the teeth are being cut, is a baby able to digest farinaceous foods, such as baked flour, powdered biscuit, small crumbled bread, and fine oat-meal, and these foods should never be given to a baby until the teeth commence to appear. Never give the baby soothing syrups, teething powders, patent medicines, patent foods, or "baby comforters."

On no account should portions of the ordinary food or drink of the mother when at meals be given to the baby; they may prove injurious and even fatal.

Weaning before Time

A mother should not wean her baby before the seventh month at the very earliest, as weaning before time is dangerous to the baby.

Every effort should be made to put off weaning until after the hot weather has come and gone, as the months of July, August, and September are particularly fatal to hand-fed babies.

If the health of the suckling mother or of the baby is failing, a doctor's advice should be sought with a view to avoiding weaning.

If the health of the mother or the breast-milk cannot be improved, and the doctor considers that the baby must be

weaned or partly hand-fed, then it should be taken regularly to the doctor for advice as to the proper food and feeding.

A hand-fed baby's progress should be very carefully watched, and if it appears to be ailing or does not thrive, medical advice should be immediately sought, especially if there be any diarrhœa, as illness in a baby develops rapidly and is soon past remedying.

Special Notice

Babies born after the beginning of April should continue to be *solely breast-fed* until the end of September at least, otherwise they run a serious risk during the hot weather of dying from diarrhœa.

Medical advice can be obtained by a mother from her private doctor, or at the various provident dispensaries, hospitals, or other public medical charities, according to her means.

Further information may be obtained from the Women Inspectors, to whom messages may be addressed, at the Public Health Department, Town Hall, Pancras Road, N.W.

JOHN F. J. SYKES,
Medical Officer of Health.

March, 1905.

ALA+ TERMINAL
GREEK CHARACTER SET

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